
I put a lot of time into producing these files which is why you are met with the above when you open the file.

In order to generate this file, I need to:

1. Scan the pages (Epson 15000 A3 scanner)
2. Split the photographs out from the text only pages
3. Run my own software to split double pages and remove any edge marks such as punch holes
4. Run my own software to clean up the pages
5. Run my own software to set the pages to a given size and align the text correctly.
6. Run Omnipage (Ultimate) on all the pages to OCR them.
7. Generate a searchable Acrobat pdf file.

Hopefully after all that, I end up with a presentable file, though I can't guarantee there aren't errors in the OCR. If you find missing pages, pages in the wrong order, anything else wrong with the file or simply want to make a comment, please drop me a line (see above).

It is my hope that you find the file of use to you personally – I know that I would have liked to have found some of these files years ago – they would have saved me a lot of time !

Colin Hinson
In the village of Blunham, Bedfordshire.

COLIN HINSON

WORLD SYSTEM TELETEXT

AND

DATA BROADCASTING

SYSTEM

(CCIR TELETEXT SYSTEM B)

TECHNICAL SPECIFICATION

February 1990

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WORLD SYSTEM TELETEXT

AND

DATA BROADCASTING SYSTEM

TECHNICAL SPECIFICATION

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WORLD SYSTEM TELETEXT - TECHNICAL SPECIFICATION

INTRODUCTION

General

The World System Teletext is optimised for the broadcast transmission medium, terrestrial and satellite and the associated service and product environment. Reliable reception of data is ensured, since there is a good match between the service area defined for vision and sound reception and that provided for data broadcasting including teletext.

The presentation and application features are arranged to be downward compatible. This permits initial services to be defined and existing services to be upgraded, without rendering equipment already in the field obsolete.

Data Organisation

The data is organised in a manner optimum for broadcast media by using the rigid timing framework of the television signal. When multiplexed with a video waveform, this permits a fixed relationship to be provided between the data bytes on a television signal data line and locations in the decoder memory. Using this relationship, error identification and correction are available, matched to the statistical occurrence of bit errors.

Data formats are also defined to suit the Satellite Broadcasting Medium, in particular the multiplex of the MAC/Packet family of systems. An analogous technique is defined for applications using the available capacity of the NICAM 728 digital television sound system.

Critical control data and addressing information are protected by Hamming coding. Basic data is protected by using parity checks. Complete blocks of data may be checked for accuracy using cyclic redundancy check words and these may also be used to provide error correction. Where the data is not multiplexed with a video waveform, further protection is provided using Golay coding.

Presentation Features

The system provides a presentation layer using alpha-mosaic and DRCS character coding. In addition to the characters, a full range of colours can be downloaded providing a colour map with four colour tables, each including eight colours.

The presentation features and range of display attributes include those of the CEPT Videotex Presentation Layer Syntax, with which they are fully compatible. These are also given in CCITT Recommendation T.101 as Annex C.

A range of display formats is available, from 40 to 160 characters per displayed row and up to 101 rows per page.

The facility to invoke the presentation of characters of any writing system or language, or a mixture of such systems is available. This includes alphabets, syllabaries and ideographic scripts and language requirements that use hybrid combinations of them. A comprehensive range is fully specified and where they have been so standardized, the character repertoires and coding structures of the ISO are used.

Alphageometric and Alphaphotographic presentation layers are provided, using the coding methods standarized by the ISO and the service profiles adopted by the CEPT.

Application Features

In addition to the basic text and graphics display presentation, a wide range of other applications can be supported.

The data can be specified as being for processing, as in the case of computer program broadcasting (Telesoftware). Data can also be specified as being of open format, to be reformatted after reception. A further type of data is defined as not having any page format, and can be of unspecified length.

A syntax for polyphonic musical data is included that can be used to control a tone synthesizer.

All the types of data, both for display and processing can be scrambled to provide access control for use with Closed User Groups or Subscription User Groups. The descrambling keys can be addressed to individual users or groups of users by an "over-air" addressing system as can credit tokens for "Pay per Use" or "Pay per View" services. Both the scrambling and addressing functions are of very high security and reliability.

Convenient user access to editorially specified pages and structured groups of pages can be provided by a page linking protocol, transmitted in a special page linking data packet. This permits selected pages to be displayed by a single key stroke, rather than the use of a multi-digit page number. An Inventory Page for each Magazine is provided to optimise memory use in decoders having large storage capacity.

Data relating to the total service on a given channel is carried in a dedicated Broadcast Data Service packet. This packet carries the address of an initial teletext page to be accessed and stored automatically on switch-on or channel selection. Date and time in standardized form are also included with provision for a displayable service message.

To permit applications such as the automatic control of video recorders, the broadcast service data packet includes data identifying the origin of a broadcast programme, the Network Identification and a programme label. Two alternative methods of labelling broadcast programmes are provided. One uses an arbitrary number and the application is described in Appendix 9. The other uses a first announced transmission time for compatibility with existing services, the application is described in Appendix 8. Both forms of label are intended for association with published programmes information using any medium including printed pages, broadcast data and teletext pages.

CHARACTERISTICS OF BROADCAST TELETEXT AND DATA SIGNALS

TRANSMISSION CODING - ANALOGUE COMPOSITE CODED SYSTEMS

ITEM	CHARACTERISTIC	625 LINE APPLICATION	525 LINE APPLICATION
1	TV Lines Usable as Data Lines	See figures 25(a) and 25(b), Subject to availability.	
1.1	When Multiplexed with a Composite Video Signal	Lines 6 to 22 and 318 to 335	Lines 10 to 19 and 272 to 281
1.2	When not Multiplexed with a Composite Video Signal	Any, except field sync and equalising pulse periods.	
2	Data Identification	Clock Run-In and Framing Code in appropriate time slot, see Section 9.	
3	Signalling Method	Binary NRZ	
4	Data Signal Levels	Systems with Negative Modulation: 0 Level Black Level ±2% 1 Level 66(±6)% of the difference between Black Level and Peak White Level	Negative Modulation Assumed: 0 Level Black Level ±2% 1 Level 70(±6)% of the difference between Black Level and Peak White Level
5	Bit Rate	444 x nominal fH (6.9375Mbits/s±25ppm)	364 x nominal fH (5.727272Mbits/s±25ppm)
6	Data Timing Reference	Peak Level of penultimate 1 of clock run-in.	
7	Spectrum of Data Pulses	Skew symetrical about 0.5 x bit rate, substantially zero by 5MHz.	Skew symetrical about 0.5 x bit rate, substantially zero by 4.2MHz.
8	Data Line Content	360 bits as 45 bytes of 8 bits each.	296 bits as 37 bytes of 8 bits each.
9	Synchronisation	See figure 1.(a)	See figure 1(b).
9.1	Clock Run-In (bit sync)	Bytes 1 and 2, begins 10101010...even parity.	
9.2	Framing Code (byte sync)	Byte 3, 11100100, even parity.	

PAGE FORMAT DATA ADDRESSING

10.	Addressing	See figures 1(a) and 2(a).	See figures 1(b) and 2(b).
10.1	Packet Numbers Format for All Data Lines	X/Y Bytes 4 and 5 Hamming Protected Applies when Y=0 to Y=29 3 bits Magazine Number X 5 bits Packet Number Y 4 bits Hamming Protection in each byte.	X/T/Y Bytes 4 and 5 Hamming protected Applies when Y=0 to Y=29 2 bits Magazine Number X 1 bit Tabulation Bit T 5 bits Packet Number Y 4 bits Hamming Protection in each byte.
10.2	Page Header Data Lines	Packet numbers X/0, see Appendix 2	Packet numbers X/0/0, see Appendix 2.
10.3	Page Number	Bytes 6 and 7 Hamming Protected 4 bits data plus 4 bits Hamming Protection in each byte.	
10.3.1	Page Sub-Code	Bytes 8, 9, 10 and 11 Hamming Protected. 4 bits data plus 4 bits Hamming protection in each byte. Byte 9 bit 8 is Control Bit C4, see Section 11.1.1. Byte 11 bits 6 and 8 are respectively Control Bits C5 and C6, see Sections 11.1.2 and 11.1.3.	
10.4	Page and Magazine Packet Relationships	Following the Page Header Packet with Y=0 of a given page, all subsequent packets with Y=1 to Y=28 inclusive, from the same magazine relate to that same page. The transmission of a given page begins with, and includes, its Page Header Packet (Y=0). It is terminated by and excludes the next Page Header Packet (Y=0) having the same magazine address but a different page address, including the sub-code. Any Packets with Y=29 relate to the included magazine address but not to a specific page. Any Packets with Y=30 and Y=31 are not page or magazine related.	

PRESENTATION LEVEL ONE
7-BIT SYNTAX

11	Presentation Level One 7 Bit Syntax	Decoder Responds to: a) Packet numbers X/0 to X/23 b) Pages 00 to 99 coded BCD c) Page Sub-Codes. The 4 digits can take values in the ranges 0 to 3; 0 to 9 0 to 7 and 0 to 9 respectively d) Optionally to packet numbers X/24 to X/29 and 8/30 The use of this 7-bit syntax is invoked by the data in Packet with Y=28, see figure 13(a). This data may be omitted for some applications, where the 7-bit syntax is used exclusively or is the default condition.	Decoder Responds to: a) Packet numbers X/0/0 to X/T/23 b) Pages 00 to 99 coded BCD c) Page Sub-Codes. The 4 digits can take values in the ranges 0 to 3; 0 to 9 0 to 7 and 0 to 9 respectively d) Optionally to packet numbers X/T/24 to X/T/29 and 4/1/30 The use of this 7-bit syntax is invoked by the data in Packet with Y=28, see figure 13(a). This data may be omitted for some applications, where the 7-bit syntax is used exclusively or is the default condition.
11.1	Control Bits in Page Header Packet Y=0	C4 to C14 are active on being set to 1. Bytes 12 and 13 contain C7 to C14, Hamming protected; for C4 to C6 see Section 10.3.1.	
11.1.1	C4 Erase Page	See Appendix 2.	
11.1.2	C5 News Flash	All displayed characters to be boxed.	
11.1.3	C6 Sub-Title	All displayed characters to be boxed.	
11.1.4	C7 Suppress Header	Header display to be suppressed.	
11.1.5	C8 Update Indicator	Following data may be limited to include only updated part of page.	
11.1.6	C9 Interrupted Sequence	Associated page is not in numerical order of page sequence.	
11.1.7	C10 Inhibit Display	Data addressed to rows 1 to 24 is not to be displayed.	
11.1.8	C11 Magazine Serial	Magazines are transmitted one at a time in sequence.	
11.1.9	C12, C13, C14	No response, see Section 14.	

11.2	Page Display		
11.2.1	Rows Displayable	24, optionally 25 Data Packet numbers X/0 to X/24, top to bottom of a magazine X page.	24, optionally 25 Tabulation bit T set to '0': Packet numbers X/0/0 to X/0/24 correspond to the first 32 character-spaces of display rows 0 to 24, top to bottom. Tabulation bit T set to 1: the two least significant bits of the packet number have 'dont care' value. The data for the final 8 character-spaces of the relative display rows is carried by these packets in order of increasing row number. Packet number X/1/0 is reserved. For bytes 22 to 37 of packets where Y can equal 24 see Section 12.3. and Section 14.6.12.
11.2.2	Character-Spaces in Rows 1 to 24	40; transmitted from left to right.	40; transmitted in two sections, each from left to right.
11.2.3	Character-Spaces in Page Header Row 0	32; transmitted from left to right.	32; transmitted in two sections, each from left to right.
11.3	Character Bytes	7 bits plus odd parity define a display or control character occupying a character-space.	
11.4	Character Sets for Display	a) 94 alphanumeric characters plus SPACE and DELETE as a default G0 set. b) 63 block mosaic characters plus SPACE and 32 alphanumeric characters as a default G1 set. The mosaic characters are displayed either with their elements contiguous or separated, see figure 4. Selection between character sets is by means of control characters, see Section 11.5.	

11.5	Control Character Set for Spacing Controls Including Display Attributes	Set of 32 control characters, 5 without response at level 1. The decoder defaults to specified attributes at the start of each display row. Some controls have effect immediately, others at the following character-space. The action of a control persists until the end of a row or until the transmission of a further control that modifies its action. See figure 5.
11.5.1	Foreground Colour	White; Yellow; Cyan; Green; Magenta; Red; Blue. Invoked with the selection of an alphanumeric or mosaic character set. See figure 5.
11.5.2	Black Background	Invoked by control character 'Black Background'.
11.5.3	New Background	Control character causes the obtaining foreground colour to be adopted as background colour.
11.5.4	Contiguous Mosaic Graphics	Mosaic blocks adjoin one another.
11.5.5	Separated Mosaic Graphics	Each mosaic block is surrounded by a border of the background colour.
11.5.6	Hold Mosaic	A Held Mosaic character is displayed in place of the character SPACE corresponding to a control character. The held mosaic character is defined only during the period when the mosaic character set is invoked. It is the mosaic character with bit 6=1 in its code, most recently transmitted before the 'hold mosaic' control, provided that there has been no intervening change of display mode, normal/double height or alphanumeric/mosaic. The held mosaic character is displayed in the original contiguous or separated form.
11.5.7	Conceal	Following characters are to be displayed as SPACES until revealed by a decoder or user operation.
11.5.8	Flash	Following characters are to be displayed normally or as SPACES in alternation, under the control of a timing device in the decoder.
11.5.9	Boxing	Part of a page is to be inserted into the normal television picture. Protection against false operation is provided by double transmission of the control characters, with action taking place between them.
11.5.10	Double Height	Characters are to be stretched vertically to occupy in addition the corresponding character-space in the display row with the next higher address; that row adopts the same display attributes as the previous row and the data in a packet addressed to that row shall be ignored. See also Section 14.5.2.

ANCILLARY TEXT RELATED DATA

12	Ancillary Text Related Data		
12.1	Linked Pages Related to a Given Page and Intended for Automatic Storage or Processing in the Decoder	Data carried by Packet X/27, see figure 2(a) and 2(c). For recommended transmission order of Packets with Y=26, 27, and 28, see Appendix 1	Data carried by Packet X/0/27, see figure 2(b) and 2(c). For recommended transmission order of Packets with Y=26, 27, and 28, see Appendix 1
12.1.1	Clock Run-In, Framing Code and Packet Address	Bytes 1 to 5 as Sections 9 and 10.	
12.2	Linked Page Addressing for Exclusively Editorial Applications. Designation Codes	Byte 6, 4 bits data plus 4 bits Hamming protection. Codes 0000 to 0011 designate editorially linked page function and are used as sequence labels for a number of Packets X/27, see figure 2(a). For an application example see Appendix 5.	Byte 6, 4 bits data plus 4 bits Hamming protection. Codes 0000 to 0011 designate editorially linked page function and are used as sequence labels for a number of Packets X/0/27, see figure 2(b). For an application example see Appendix 5.
12.2.1	Linked Page Addresses, Designation Codes 0000 to 0011	Bytes 7 to 42 as 6 groups of 6 bytes. Each group of 6 bytes defines a linked page address, the groups are numbered 0 to 5 in order of transmission. See also Section 12.2.3.	Bytes 7 to 36 as 5 groups of 6 bytes. Each group of 6 bytes defines a linked page address, the groups are numbered 0 to 4 in order of transmission. See also Section 12.2.3.
12.2.2	Data Group Format Defining an Editorial Linked Page	6 bytes containing: Relative Magazine Number.....3 bits Page Number.....8 bits Page Sub-Code.....13 bits Hamming Protection.....24 bits For bit sequence see figure 2(a) or 2(b) When a page number is not to be specified, the page number FF is transmitted. When a page sub-code is not to be specified, page sub-code 3F7F is transmitted. When the code FF3F7F is transmitted no page is specified. See also Appendix 6. For 525 line applications the third bit of the relative magazine number is the tabulation bit T. It is set to 0 and has no meaning in the linked address.	

<table>
<tr><td>12.2.3</td><td>Editorial Link Control and Display Row 24 Flag</td><td>Byte 43, 4 bits data plus 4 bits Hamming Protection</td><td>Byte 37, 4 bits data plus 4 bits Hamming Protection</td></tr>
<tr><td>12.2.3.1</td><td>Link Control Data Bit Format</td><td colspan="2">Bit 1 Bit 2
0 0 Pages not Chained
1 0 Start of Chain of Pages
0 1 End of Chain of Pages
1 1 Within Chain of Pages
Bit 3
0 Data Intended for Direct Display
1 Data for Processing of Variable Length

For pages of data for processing that are chained, link address 0 with designation code 0000 is the next page in the chain. Other link addresses with designation code 0000 and all link addresses in packets with designation codes 0001 to 0011 specify starting page addresses of chains of pages that include data for processing. Chains may be identified by the designation code and the linked page address.

Data bits 1, 2 and 3 above may be reserved for future standardization, when there are no requirements for existing services and products.</td></tr>
<tr><td>12.2.3.2</td><td>Display Row 24 Flag</td><td colspan="2">Bit 4
Set to '0' Data in packets with Y=24 is not to be displayed.
Set to '1' Data in packets with Y=24 is to be displayed in row 24.</td></tr>
<tr><td>12.3</td><td>Basic Page Check Word</td><td>Bytes 44 and 45 of packets with the Designation Code 0000 will contain a Cyclic Redundancy Check on data in packets X/0 to X/25.

For Check Word generation see figure 10.</td><td>Bytes 31 and 32 of packets with T=1 and the Designation Code 0000 will contain a Cyclic Redundancy Check on the data in packets X/0/0 to X/0/25 and X/1/Y where Y is the packet number with the two least significant bits having 'dont care' value. The reserved packet X/1/0 and bytes 22 to 37 of packets X/1/Y where Y can equal 24 are excluded. See also 14.6.12.

The Cyclic Redundancy Check word may also be carried in bytes 30 to 34 of a packet X/1/24, containing:
Cyclic Redundancy Check Word....16 bits
Hamming protection.....16 bits
Bytes 34 to 37 are reserved.

For Check Word generation see figure 10.</td></tr>
</table>

12.4	Linked Page Addressing for Compositional Applications	Byte 6, 4 bits data plus 4 bits Hamming protection. Codes 0100 to 0111 designate linked pages function for compositional applications and are used as sequence labels for a number of packets X/27.	Byte 6, 4 bits data plus 4 bits Hamming protection. Codes 0100 to 0111 designate linked pages function for compositional applications and are used as sequence labels for a number of packets X/27.
12.4.1	Linking Data	Bytes 7 to 42 as 6 groups of 3+3 bytes, each including 18 bits data plus 6 bits Hamming protection. Bytes 43 to 45 include 18 data bits set to '0' plus 6 bits Hamming protection.	Bytes 7 to 36 as 5 groups of 3+3 bytes, each including 18 bits data plus 6 bits Hamming protection. Byte 37 is reserved.
12.4.2	Data Group Format Defining a Compositional Linked Page	6 bytes containing: Relative Magazine Number.....3 bits Page Number.....8 bits Page Sub-Code.....13 bits Link Control Data.....12 bits Hamming Protection.....12 bits For bit sequence see figure 2(c). For interpretation of the Link Control Data see figure 2(d). For 525 line applications the third bit of the relative magazine number is the tabulation bit T. It is set to 0 and has no meaning in the linked address.	When a page number is not to be specified the page number FF is transmitted. When a page sub-code is not to be specified page sub-code 3F7F is transmitted. When the code FF3F7F is transmitted no page is specified and the link control data bits are set to '1'.

12.5	Links to Page Access Data	The Data is carried by a packet X/26. This data provides links to access data for a particular page in a general service. It is distinct from the Conditional Access Services, the protocols for which are defined in Sections 20 and 22.	The data is carried by a packet X/0/28. This data provides links to access data for a particular page in a general service. It is distinct from the Conditional Access Services, the protocols for which are defined in Sections 20 and 22.
12.5.1	Clock Run-In, Framing Code and Packet Address	Bytes 1 to 5 as Sections 9 and 10.	
12.5.2	Designation Code	Byte 6, 4 bits data plus 4 bits Hamming protection. Data bits set to 0011.	
12.5.3	Data Groups	Bytes 7 to 45 used as 13 groups of 18 bits data and 6 bits Hamming protection.	Bytes 7 to 36 used as 10 groups of 18 bits data and 6 bits Hamming protection. Byte 37 is reserved.
12.5.3.1	Access Data Bit Allocation	(1) Encryption method 8 bits See figure 26. (2) Set to '0' 10 bits (3) Initial Variable 64 bits (4) Set to '0' 8 bits (5) Key Location 32 bits Set to '0' when not present (6) Set to '0' 4 bits (7) Key Identification 16 bits (8) Set to '0' 2 bits The remaining 5 groups of 18 data bits are reserved.	(1) Encryption method 8 bits See figure 26. (2) Set to '0' 10 bits (3) Initial Variable 64 bits (4) Set to '0' 8 bits (5) Key Location 32 bits Set to '0' when not present (6) Set to '0' 4 bits (7) Key Identification 16 bits (8) Set to '0' 2 bits The remaining 2 groups of 18 data bits are reserved.

12.6	Magazine Inventory Page	This page provides an inventory of the page addresses and number of pages for each address that are currently active in the included magazine. The data is primarily intended to assist memory management in decoders with multipage storage facilties. The data is not intended for direct display, but display can be provided when suitable processing is available. The data is carried by a page with an address and sub-code defined in an associated packet with Y=29 or with the default value FE3F7E.
12.6.1	Clock Run-In, Framing Code and Packet Address	Bytes 1 to 5 as Sections 9 and 10.
12.6.2	Page Header Packet Y=0	Header Packets with Tabulation Bit T set to 1 are reserved.
12.6.2.1	Control Bits in Header Packet Y=0	Set as follows: C4 Erase Page — Set as required C5 News Flash — Set to 0 C6 Sub-Title — Set to 0 C7 Suppress Header — Set to 1 C8 Update Indicator — Set as required, complete page shall always be transmitted C9 Interrepted Sequence — Set to 1 C10 Inhibit Display — Set to 1 C11 Magazine Serial — Set as required C12, C13, C14 Have no function in this application and may have any value.
12.6.2.2	Character-Spaces in Page Header Row 0	Suppress Header Control Bit is to be Set, the data bytes corresponding to the 32 character-spaces are reserved.

12.6.3	Inventory Data	Carried by packets X=1 to X=16, bytes 6 to 37. Bytes 38 to 45 and packets 17 to 28 are reserved.	Carried by packets X/0/1 to X/0/16. Packets 17 to 28 and Packets with Tabulation Bit T set to 1 are reserved.
12.6.3.1	Data Format	The Data bytes 6 to 37 of packets with Y=1 to Y=16 are used as 16 two byte data words. Each byte contains 7 active bits plus a parity bit. The position of the data word in the packet and the packet number define a page address. The first data word in the packet with Y=1 corresponds to page 00. The sequence proceeds through the packets with the penultimate data word in the packet with Y=17 corresponding to page FE. The final data word in the packet with Y=16 is a continuity indicator, transmitted least significant bit first and incremented at every change in the content of the inventory page. See figure 77.	
12.6.3.2	Data Word	The 14 data bits, commencing with the least significant bit, are allocated as follows: (a) Number of pages currently included with the defined page address....13 bits Maximum number of pages 8190. Set to all 0s, no pages with this address are included in the service. Nevertheless, pages with this address may be transmitted for other applications. Set to hexadecimal 0001, only one version of the page with this address is included, it has sub-code 0000. Set to hexadecimal 0002, two versions of the page with this address are included, normally sub-coded 0001 and 0002. The sequence proceeds to hexadecimal 1FFE, specifying that 8190 versions of the page with this address are included. Set to hexadecimal 1FFF, reserved. (b) Reserve Memory Flag...1 bit Set to 0, pages include features such as animation and dynamic effects and should not be stored in separate locations. Set to 1, for optimum user access, memory space may be reserved.	

BROADCAST SERVICE DATA

13	Broadcast Service Data Packet	Packet 8/30, transmitted approximately once per second or more frequently if required by the service. For bit sequence see figure 2(a).	Packet 4/1/30, transmitted approximately once per second or more frequently if required by the service. For bit sequence see figure 2(b). The value of tabulation bit T, 0 or 1, is only significant for the Status Display bytes, see Section 13.2.8 and 13.3.5.
13.1	Clock Run-In Framing code and Packet Address	Bytes 1 to 3 as Section 9.	
13.2	Format 1 Packet		
13.2.1	Designation Code	Byte 6, 4 bits data plus 4 bits Hamming protection. First data bit set to 0 designates multiplexed function as in Section 1.1. First data bit set to 1 designates non-multiplexed function as in Section 1.2. Data bits 2, 3 and 4 set to 0 designate the functions in Sections 13.2.2 to 13.2.8	
13.2.2	Initial Teletext Page for Storage in Decoder without User Action	Bytes 7 to 12 containing: Absolute Magazine Number.....3 bits Page Number.....8 bits Page Sub-Code.....13 bits Hamming Protection.....24 bits When a page number is not to be specified, the page number FF is transmitted. When a page sub-code is not to be specified the page sub-code 3F7F is transmitted. When the code FF3F7F is transmitted, no page is specified. For 525 line applications the third bit of the relative magazine number is the tabulation bit T. It is set to 0 and has no meaning in the initial page address.	
13.2.3	Network Identification	Bytes 13 & 14. The permanently assigned code uniquely defines the network.	
13.2.4	Time Offset Code	Byte 15. Defines offset, in half hour units between local time and Co-ordinated Universal Time (UTC). Negative offsets are West of Greenwich. See figure 9.	
13.2.5	Modified Julian Date	Bytes 16 to 18. 5 digit number defining Modified Julian Date (MJD) incrementing daily at midnight UTC. Reference point is 31 January 1982, MJD 45000. See figure 9.	

13.2.6	Co-Ordinated Universal Time	Bytes 19 to 21. 6 digit number defining Co-ordinated Universal Time. The transmission relates to the next following second. See figure 9.	
13.2.7	1st Short Programme Label	Bytes 22 and 23. 16 bits define a Programme Label for the currently transmitted programme. See Appendix 9	
13.2.8	2nd Short Programme Label	Bytes 24 and 25. 16 bits define a Programme Label for the currently transmitted programme. See Appendix 9	
13.2.9	Status Display	Bytes 26 to end of packet. This group is coded with odd parity characters from the default primary character set and where appropriate using the characters common to the range of options. It is intended to display a transmision status message.	Bytes 26 to end of packet. This group is coded with odd parity characters from the default primary character set and where appropriate using the characters common to the range of options. It is intended to display a transmission status message. The message commences with the data in the packet with T=0 and may continue using the data in the packet with T=1.

13.3	Format 2 Packet	When format 1 packets are also present in a given transmission, the data in bytes 7 to 12 and 26 to the end of the packet shall be the same for both formats.
13.3.1	Designation Code	Byte 6, 4 bits data plus 4 bits Hamming protection. First data bit set to 0 designates multiplexed function as in Section 1.1. First data bit set to 1 designates non-multiplexed function as in Section 1.2. Data bit 2 set to 1 and data bits 3 and 4 set to 0 designate the functions in Sections 13.3.2 to 13.3.3.7.
13.3.2	Initial Teletext Page for Storage in Decoder without User Action	Bytes 7 to 12 containing: Relative Magazine Number.....3 bits Page Number.....8 bits Page Sub-Code.....13 bits Hamming Protection.....24 bits When a page number is not to be specified, the page number FF is transmitted. When a page sub-code is not to be specified the page sub-code 3F7F is transmitted. When the code FF3F7F is transmitted, no page is specified. For 525 line applications the third bit of the relative magazine number is the tabulation bit T. It is set to 0 and has no meaning in the initial page address
13.3.3	Reserved Byte	Byte 13 is reserved for future applications.
13.3.4.	Programme Control Status Sound Channel Mode	Byte 14, 4 bits data plus 4 bits Hamming protection: b1 b2 0 0 Status not defined 0 1 Monophonic Sound 1 0 Stereo Sound 1 1 Dual Channel Sound Bits 3 and 4 are reserved.

13.3.5	Programme Identification Data	Bytes 15 to 23, each 4 bits data plus 4 bits Hamming protection. Comprises data bits 1 to 36.
13.3.5.1	Country Identification Data	Data bits 1 to 4 define the row in the code table of figure 79. For column definition see Section 13.3.5.4.
13.3.5.2	Network or Programme Identification Data	Data bits 5 and 6 define the final 2 bits of the Network or Programme Identification Data Word. For first 6 bits see Section 13.3.5.5.
13.3.5.3	Programme Identification Label	Data bits 7 to 26 identify a programme by its scheduled transmission date and time Bits 7 to 11 Scheduled Date Day Bits 12 to 15 Scheduled Date Months Bits 16 to 20 Scheduled Time Hours Bits 21 to 26 Scheduled Time Minutes
13.3.5.4	Country Identification Data	Data bits 27 to 30 define the column in the code table of figure 79. For row definition see Section 13.3.5.1.
13.3.5.5	Network or Programme Identification Data	Data bits 31 to 36 define the first 6 bits of the Network or Programme Identification Data Word. For final 2 bits see Section 13.3.5.2.
13.3.6	Programme Type/Series Code Data	Bytes 24 and 25, each 4 bits data plus 4 bits Hamming protection. The groups of 4 bits represent respectively the first and second digits of a hexadecimal number, each group transmitted least significant bit first. The hexadecimal numbers represent entries in the table of figure 80. Application information for the data in Section 13.3 is included in Appendix 4.
13.3.7	Status Display	Bytes 26 to end of packet. This group is coded with odd parity characters from the default primary character set and where appropriate using the characters common to the range of options. It is intended to display a transmission status message. For 525 line applications the message commences with the data in the packet with T=0 and may continue using the data in the packet with T=1.

14	Additional Character Repertoires and Display Attributes	Decoder responds as Level 1 plus Packets X/26 and X/28. For recommended transmission order of Packets with Y=26, 27 and 28 see Appendix 1.	Decoder responds as Level 1 plus Packets X/T/26 and X/T/28. For recommended transmission order of Packets with Y=26, 27 and 28 see Appendix 1.
14.1	Control Bits in Page Header	As Level 1, see Section 11.1.	
14.1.1	C4 to C11	As Level 1, see Sections 11.1.1 to 11.1.8.	
14.1.2	C12, C13 and C14 Primary Character Set Options	Decoder displays text using one of eight options related to the designated or default Primary Charater Set. See figure 14.	
14.2	Page Display		
14.2.1	Rows Displayed	As Level 1 Section 11.2.1.	
14.2.2	Character-Spaces in Display Rows 1 to 24	As Level 1 Section 11.2.2.	
14.2.3	Character-Spaces in Display Row 0 Page Header	As Level 1 Section 11.2.3.	

Option Number	C12	C13	C14
1)	0	0	0
2)	0	0	1
3)	0	1	0
4)	0	1	1
5)	1	0	0
6)	1	0	1
7)	1	1	0
8)	1	1	1

14.3	Data Bytes	Carried by Packets with Y=0 to Y=29
14.3.1	Data Packets Other Than Where Y=26, 28 and 29.	As Level 1 Sections 11.3, 12 and 13.
14.3.2	Data Packets Where Y=26, 28 and 29	For these packets, following the clock run-in, framing code, magazine and packet address, there is a designation code in byte 6. The following data is used as a sequence of three byte groups comprising 18 data bits and 6 Hamming protection bits. For applications see Section 14.6 to end of Section 14. Packets with Y=26 address a character location within a page. They can invoke a character set and write it in the display. They can also invoke a character set and a latching shift. The character sets may be either display or attribute control characters. Packets with Y=28 define the coding method and error protection. They also designate character sets and dynamically redefine the colour map. Packets with Y=29 designate aspects of the display that apply to the magazine defined in the address of the packet with Y=29.
14.4	Character Sets for Display	Four Character Sets, in G0, G1, G2 and G3 code tables may be designated, using the data in packets with Y=28 or may be defined as default sets. They are invoked by the data in packets with Y=26. Each designated G0 set may have up to 8 options defined. These are invoked by the Page Header Control Bits C12, C13 and C14. See figure 14 for character set identification.

14.5	Control Character Set for Spacing Controls Including Display Attributes	Set of 32 Control Characters, action as Level 1, see Section 11.5, except as defined in Section 14.5, see also figure 5.
14.5.1	Foreground Colours	As Level 1 plus black, see Section 11.5.1 and figure 5.
14.5.2	Size Attributes	Double-Height characters extend downwards, the origin of a character is the upper character position. The double-height and double-size controls are inactive on the bottom row of the defined display area, and the bottom row of a scrolling region. The whole of a enlarged character is displayed with the attributes that apply to the origin of the character. Parts of enlarged characters are not displayed, the double-width and double-size controls are inactive in the last character position of a display row. Attributes set at obscured character positions do not take effect if they would break any of the above rules. The application of one SIZE attribute control terminates the action of any other SIZE attribute. At Level 2, where double height or double size characters are included in a given display row, data may be addressed to the row with the next higher address and shall be processed normally, taking into account the above rules. In the absence of such data, the attributes of the previous row are adopted.
14.5.2.1	Double Width	Characters are to be stretched horizontally, to occupy in addition, the next character-space.
14.5.2.2	Double size	Characters are to be stretched horizontally and vertically, to occupy in addition, the character-spaces as in Sections 11.5.10 and 14.5.2.1.

14.6	Character Set Extension and Non Spacing Control Characters for Display Attributes	Uses Packets with Y=26 to overwrite any character-space. The original character and attribute condition is the editor defined fallback for Level 1 decoders. For recommended transmission order of packets with Y=26, Y=27 and Y=28, see Appendix 1.	
14.6.1	Clock Run-In, Framing Code and Packet Address	Bytes 1 to 5, see Sections 9 and 10.	Bytes 1 to 5, see Sections 9 and 10. For use of Tabulation bit T, see Section 14.6.2.
14.6.2	Designation Code	Byte 6, 4 bits data plus 4 bits Hamming protection. Codes 0000 to 1111 are sequence labels for up to 16 packets with Y=26 associated with a given page.	Tabulation bit T is the most significant bit of the Designation Code, then follows byte 6 with 4 bits data plus 4 bits Hamming protection. Codes 00000 to 11111 are sequence labels for up to 32 packets with Y=26 associated with a given page.
14.6.3	Data Groups	Bytes 7 to 45, as 13 groups of 3 bytes each.	Bytes 7 to 36, as 10 groups of 3 bytes each. Byte 37 is reserved.
14.6.3.1	Data Group Bit Allocation Format A	6 bits for display address 5 bits for mode description 7 bits data 6 bits Hamming protection	

14.6.4	Display Addressing Display Rows 1 to 24	6 display address bits, as in Section 14.6.3 provide 64 combinations. The decimal values 0 to 39 specify character-spaces along a given display row. The decimal values 41 to 63 specify a display row, 1 to 23, value 40 specifies row 24. A character-space is thus defined explicitly by a data group including a row address, followed by one or more character position data groups. Although the character-spaces are explicitly addressed, the data groups in Packets with Y=26 shall be transmitted in display order, left to right, top to bottom of the display area.
14.6.4.1	Display Addressing Display Row 0	The Row Group Mode Description Bits are set to 00111. The row address is set to correspond to row 23 (decimal value 63). Following data groups with display addresses in the range decimal 0 to 39 specify character-spaces in row 0. When the 7 data bits are set to "0" no Full Row Colour is invoked. When data bits 6 and 7 are set respectively to "01", data bits 1 to 5 define the Full Row Colour according to figure 7. Other settings of bits 6 and 7 and the associated interpretation of bits 1 to 5 are reserved. The decimal values 40 to 62 shall not be used. Should they occur the associated three byte data group shall be ignored. Although the character-spaces are explicitly addressed, the data groups in Packets with Y=26 of this type shall be transmitted in display order, left to right, of the display area.

14.6.5	Display Colours	The Foreground and Background colours of a character cell take precedence over the Full Row and Full Screen colours. Transparent Foreground and Transparent Background colours cause the Full Row or Full Screen colour to be displayed. Full Row colours take precedence over Full Screen colours. Transparent Full Row and Transparent Full Screen permit the display of the video picture where the Foreground and Background colours are also transparent.
14.6.5.1	Foreground Colour	For a character displayed at a character space addressed as in Section 14.6.4. The mode description bits are set to 00000. Data bits 1 to 5 define the Foreground Colour according to figure 7, when data bits 6 and 7 are set to 0. The effect of this attribute persists to the end of a display row unless overriden by a further control defining the Foreground colour.
14.6.5.2	Background Colour	For a character displayed at a character space addressed as in Section 14.6.4. The mode description bits are set to 00011. Data bits 1 to 5 define the Background Colour according to figure 7, when data bits 6 and 7 are set to 0. The effect of this attribute persists to the end of a display row unless overriden by a further control defining Background Colour.
14.6.5.3	Full Row Colour Including Borders Outside Normal Text Display Area	Invoked when the mode description bits of a row address are set to 00001. Data bits 1 to 5 define Full Row colour according to figure 7. When data bits 6 and 7 are set to 0, the Full Row colour applies only to the addressed row. When data bits 6 and 7 are set to 1, the Full Row colour applies to the area from and inclusive of the addressed row to the bottom of the screen, unless overriden by a further Full Row colour control.
14.6.5.4	Full Screen Colour Including Borders Outside Normal Text Display Area	Invoked when the mode description bits of any row address data group are set to 00000. Data bits 1 to 5 define the Full Screen colour according to figure 7, when data bits 6 and 7 are set to 0.

14.6.6	Character Sets	Default sets may be specified. Otherwise initial designation by Packet 28, see Section 14.9 and figure 14. Designation modifiable by the data in Packet 26, see Section 14.6.6.7. Equipment intended for operation with only a single group of character sets may ignore this data.
14.6.6.1	Characters Including Diacritical Marks Composed from the Primary and Supplementary Sets	For display at a character-space addressed as in Section 14.6.4. The Mode Description bits, set at the range of values 10000 to 11111 respectively define diacritical marks from column 4 of the G2 supplementary character set, in ascending numerical order. The associated character from the G0 primary character set is defined by the 7 data bits. Character sets are listed in figure 14.
14.6.6.2	Characters from the Supplementary Set	For display at a character-space addressed as in Section 14.6.4. The Mode Description bits are set to 01111. The 7 data bits define a character from the supplementary character set. Character Sets are listed in figure 14.
14.6.6.3	Block Mosaic Characters (not smoothed)	For display at a character-space addressed as in Section 14.6.4. Mode Description bits are set to 00001. The 7 data bits define a character from the block mosaic character set, when it is the default G1 set or when designated as the G1 set.
14.6.6.4	Block Mosaic Characters (smoothed)	For display at a character-space addressed as in Section 14.6.4. Mode Description bits are set to 00010. The 7 data bits define a character from the smoothed block mosaic character set, when it is the default G3 set or when designated as the G3 set.
14.6.6.5	Latching Shifts to Designated Character Sets	From a display character-space addressed as in Section 14.6.4, Mode Description bits set to 00100, the first six combinations of the 7 data bits define one of the designated character sets, see figure 12(a). The latching shift persists until explicitly cancelled, the transmission of another group with Mode Description bits set to 00100 or the end of a display row. For other data bit combinations see Section 14.6.6.6.
14.6.6.6	Combined Character Set Invokation and Latching	From a display character-space addressed as in Section 14.6.4, Mode Description bits set to 00100 see figure 12(a). Data bit combinations 0000110 to 1111110 invoke and latch a character set defined in figure 14. The latching shift persists until explicitly cancelled, the transmission of another group with Mode Description bits set to 00100 or the end of a display row.

14.6.6.7	Single Shift to Designated Character sets	At a display character-space addressed as in Section 14.6.4, mode description bits set to 00101. The first six combinations of the 7 data bits define one of the designated character sets, see figure 12(b). For other data bit combinations see Section 14.6.6.8.
14.6.6.8	Combined Character Set Invokation and Single Shift	At a display character-space addressed as in Section 14.6.4, Mode Description bits set to 00101 see figure 12(b). Data bit combinations 0000110 to 1111110 invoke and shift to a character set defined in figure 14.
14.6.6.9	Modified Character Set Designation	The character set designated into the G0, G1, G2 and G3 code tables may be modified from that of packet 28 by transmitting the Mode Description bits set respectively to 01000, 01001, 01010 and 01011. The 7 data bits define a character set from figure 14. The modified designation persists until the end of a display row or until further modification is signalled. It then reverts to the previously obtaining invokations defined in a packet with Y=28 or in the absence of such a packet with Y=28 to the default condition.

14.6.7	Display Attributes	These attributes can act together at a given character space. The action persists to the end of a display row and may be cancelled by the transmission of the same data group with the appropriate bit set to '0', or by a level 1 attribute control code. Invoked by the Mode Description bits set to 01100.
14.6.7.1	Mosaic Graphics Separated or Alphanumerics Underlined	Alphanumeric characters following this control character are displayed underlined and mosaic characters are displayed in the separated mode as in Section 11.5.4 until the receipt of a Cancel-Underline/Contiguous Mosaic Graphics control character or the end of a display row. Activated by data bit 6 set to 1.
14.6.7.2	Boxing/Window	The Boxing attribute acts as Level 1 when the control bits C5 or C6 in the page header packet are set to 1. When neither of these control bits are set to 1, at Level 2 this attribute has the window function. In this case it defines an area where the full screen colour becomes transparent, permitting any video picture to become visible, where the foreground and background colours are also transparent. Activated by data bit 2 set to 1.
14.6.7.3	Conceal	Action as Section 11.5.7 at a character space addressed as in Section 14.6.4. Activated by data bit 3 set to 1.
14.6.7.4	Marked Area	The Marked Area starts at a character space addressed as in Section 14.6.4. Activated by data bit 4 set to 1.
14.6.7.5	Invert	Action at a character space addressed as in Section 14.6.4. This attribute exchanges Foreground and Background Colours and inverts the phase of the flashing clock. Activated by data bit 5 set to 1.

14.6.7.6	Double Height	Action as Section 11.5.10 at a character-space addressed as in Section 14.6.4. Activated by data bit 1 set to 1.
14.6.7.7	Double Width	Action as Section 14.5.3.1 at a character-space addressed as in Section 14.6.4. Activated by data bit 7 set to 1.
14.6.7.8	Double Size	Action as Section 14.5.3.2 at a character-space addressed as in Section 14.6.4. Activated by data bits 1 and 7 both set to 1.
14.6.8	Additional Flash Functions	Action at a character-space addressed as in Section 14.6.4 invoked by mode description bits set to 00111 Action of data bits: b2 b1 0 0 Steady 0 1 Normal Flash to Background Colour 1 0 Invert Phase of Flash to Background Colour 1 1 Flash to next Colour Table (1 to 2, 2 to 1, 3 to 4, 4 to 3) b5 b4 b3 0 0 0 Slow Rate 1Hz 0 0 1 Fast Rate 2Hz Phase 1 0 1 0 Fast Rate 2Hz Phase 2 0 1 1 Fast Rate 2Hz Phase 3 1 0 0 Incremental Flash, apparent movement to right, 2Hz 1 0 1 Decremental Flash, apparent movement to left, 2Hz 1 1 0 No action 1 1 1 No action Incremental and Decremental Flash always start with Phase 1. The Invert attribute (see Section 14.6.7.5) applies whatever the condition and thus restores an Invert Flash invoked as above to Normal and vice versa.

14.6.9	Scrolling	Invoked when mode description bits of a row address are set to 00101. Data bits 1 to 5 define the colour of the scrolling region from the colour map. Data bits 6 and 7 are set to 0. The last row of the scrolling region is defined by the mode description bits of a row address being set to 00110. In this case the data bits 1 to 5 define the Full Row colour from the next row to the border area inclusive. Data bits 6 and 7 are set to 0. The scrolling function can only be activated when the page also includes a packet with Y=27, with the link control data indicating a chain of pages, see figure 2(d). Data on the first page of a chain for display within the scrolling region and all subsequent pages of the chain may be scrolled through the region under user control. The first page may include data for display above and below the scrolling region. This data is to be displayed throughout the scrolling operation. Data to be scrolled may alternatively be carried on a pseudo page, see Section 15.5. The border of the scrolling region must not be crossed by a double height or a double size character. When the origin of such a character is scrolled out of the scrolling region, the complete character shall disappear from the display.	
14.6.10	Cursor Display	The display of a cursor is activated by the transmission of the appropriate mode description row group with the bits set to 00100. The column position of the cursor, 0 to 39, left to right, is defined by setting the data bits to correspond with the codes 4/0 to 6/7. Other codes are to be interpreted as 'No Cursor'.	
14.6.11	Termination Marker	Since more than one packet with Y=26 may be needed to display a given page, a terminator is provided by setting the Row Address and Mode Description bits all to 1, in a data group occupying bytes 40, 41 and 42 in the final packet with Y=26. There is no response to the data in byte 42. Any unused data groups between the active data groups and the termination group shall be filled with repetitions of the data in the termination group.	Since more than one packet with Y=26 may be needed to display a given page, a terminator is provided by setting the Row Address and Mode Description bits all to 1, in a data group occupying bytes 34, 35 and 36 in the final packet with Y=26. There is no response to the data in byte 33. Any unused data groups between the active data groups and the termination group shall be filled with repetitions of the data in the termination group.

14.6.12	Check Word for Packets with Y=26 and Y=28	The 18 data bits of the final three byte data group in the packet with Y=26 with designation code 1111, have the two most significant bits set to '0' and a 16 bit Cyclic Redundancy Check on the data in packets with Y=26 and Y=28. Generation of the check word is identical to that of Section 12.3 using the data in packets with Y=28 followed by that in packets with Y=26. The sequence assumes the presence of 16 packets with Y=28 and 16 packets with Y=26. It is completed by assuming that packets that are not present have the 18 data bits in each 3-byte data group set to '0'. When there is data in a packet with Y=28 but no data in packets with Y=26, only the termination marker, (see Section 14.6.11) and the Cyclic Redundancy Check Word will be carried by a packet with Y=26.	Bytes 33 and 34 of packets X/1/27 carrying the Designation Code 0000 will contain a Cyclic Redundancy Check on data in packets with Y=26 and Y=28. Bytes 35 and 36 are reserved. The Cyclic Redundancy Check word may also be carried in a packet X/1/24 as follows. Bytes 22 to 25 of packet X/1/24 containing: Cyclic Redundancy Check on data in packets with Y=26 and Y=28....16 bits Hamming protection.....16 bits Bytes 26 to 29 are reserved. Generation of the check word is identical to that of Sections 12.3 using the data in packets with Y=28 followed by that in packets with Y=26. The sequence assumes the presence of 32 packets with Y=28 and 32 packets with Y=26. It is completed by assuming that packets that are not present have the 18 data bits in each 3-byte data group set to '0'. When there is data in a packet with Y=28 but no data in packets with Y=26, only the termination marker, (see Section 14.6.11) will be carried by a packet with Y=26.

14.7	Character Set Extension Sanscrit Derived Languages	Uses Packets with Y=26 with data group bit allocations format B and C to add diacritical marks to a basic character at any character-space. This application is intended for languages and writing systems where a large number of displayed characters require such diacritical marks. For recommended transmission order of packets with Y=26, Y=27 and Y=28, see Appendix 1.	
14.7.1	Clock Run-In, Framing Code and Packet Address	Bytes 1 to 5, see Sections 9 and 10.	Bytes 1 to 5, see Sections 9 and 10. For use of Tabulation bit T, see Section 14.6.2.
14.7.2	Designation Codes	Byte 6, see Section 14.6.2.	
14.7.3	Data Groups	Bytes 7 to 45, as 13 groups of 3 bytes each. Each 3 byte group comprises 18 data bits plus 6 bits Hamming protection. See figure 30(a).	Bytes 7 to 36, as 10 groups of 3 bytes each. Byte 37 is reserved. Each 3 byte group comprises 18 data bits plus 6 bits Hamming protection. See figure 30(b).
14.7.4	Mode Definition Group for Addressing Character Positions in Rows 1 to 24	The first group of 18 data bits. These bits specify this mode for the rest of the packet with Y=26. (1) Row Address of first Data Word in the Packet 6 bits (2) Mode Description set to 00011 (3) Set to '0' 7 bits (4) Hamming protection 6 bits Row addresses correspond to the decimal row numbers.	
14.7.5	Mode Definition Group for Addressing Character Positions in Row 0	The first group of 18 data bits. These bits specify this mode for the rest of the packet with Y=26. (1) Set to '1' 6 bits (2) Mode Description set to 00010 (3) Set to '0' 7 bits (4) Hamming protection 6 bits The data bits (1) above are not to be interpreted as a 'Row Address'.	
14.7.6	Data Groups Following Mode Definition Group	Each group of 18 data bits is used as two nine-bit data words: Bits 1 to 5 Display address Bits 6 to 9 Diacritical Mark	

14.7.7	FORMAT B	Format B applies when the diacritical marks are exclusively above or below a character and no half width characters are displayed.
14.7.7.1	Display Addressing	The 5 addressing bits are considered in terms of their decimal equivalent values. Decimal values 1 to 23 specify a display row explicitly and implicitly the first character-space in that row, value 0 specifies row 24 similarly. Decimal values 24 to 31 specify the increment in character position relative to the previous one addressed. up to 8 character positions. When an increment in character position greater than 8 is required, this is provided by including a group with the NUL diacritical mark from the in use code table. Except for the Terminator (see Section 14.7.9) character positions greater than decimal 39, i.e. beyond the normal display area, shall not be addressed. Should such a value occur. the complete 9-bit word shall be ignored. When the Mode Definition Group defines the data as being addressed to display row 0, the address bits shall not be set to to correspond with the decimal values 0 to 23. Should such values occur the complete 9-bit data word shall be ignored.
14.7.7.2	Character Coding	The final 4 bits of each 9 bit data word define a diacritical mark from the appropriate column of the in use G2 code table, in ascending numerical order. A NUL character is included to provide display row address extension, see Section 14.7.7.1. Characters from the G2 code table that are not diacritical marks are displayed using Format A packets with Y=26. This can be either by overwriting specified character positions or a latching shift. The required character set is invoked by the data in a packet with Y=28, see Section 14.9.

14.7.8	Format C	Format C applies when diacritical marks occur on the left and right hand sides of characters as well as above and below. It also applies when half width characters are to be displayed.
14.7.8.1	Characters in Packets with Y=0 to Y=23	Unless otherwise specified. characters of the G0 code table are displayed with the standard width. Specified groups of characters are displayed with half the standard width. These characters may be identified as being placed to the right or left of a standard width character.
14.7.8.2	Display Addressing Packets with Y=26	The 5 addressing bits are considered in terms of their decimal equivalent values. Decimal values 1 to 23 specify a display row explicitly and implicitly the character in the first character-byte in that row, value 0 specifies row 24 similarly. Decimal values 24 to 31 specify the increment in character bytes along the packet relative to the previous one addressed. up to 8 byte locations. When an increment in bytes along the packet greater than 8 is required, this is provided by including a group with the NUL diacritical mark from the in use code table. Except for the Terminator (see Section 14.7.9) byte locations greater than decimal 39. i.e. beyond the end of a packet, shall not be addressed. Should such a value occur. the complete 9-bit word shall be ignored. When the Mode Definition Group defines the data as being addressed to display row 0, the address bits shall not be set to to correspond with the decimal values 0 to 23. Should such values occur the complete 9-bit data word shall be ignored.
14.7.8.3	Character Coding	The final 4 bits of each 9 bit data word define a diacritical mark from the appropriate column of the in use G2 code table. in ascending numerical order. A NUL character is included to provide display row address extension, see Section 14.7.8.2. Characters from the G2 code table that are not diacritical marks are displayed using Format A packets with Y=26. This can be either by overwriting specified character positions or a latching shift. The required character set is invoked by the data in a packet with Y=28, see Section 14.9.
14.7.9	Termination Marker	The sequence of packets with Y=26 format B or C may be terminated by a change to format A and the inclusion of the Terminator defined in Section 14.6.11. Where a change to format A is not required the sequence using format B shall be terminated by a 9-bit data word addressing character position 40 of the last display row of the page requiring a diacritical mark, the last four data bits defining the NUL diacritical mark from the code table.

14.8	Colour Dynamic Redefinition	The Colour Map may be redefined, Colour Look-Up Table entries specified and an alternative Colour Table invoked for a given page, using data in packets with Y=28. For recommended transmission order of packets with Y=26, 27 and 28, see Appendix 1.	
14.8.1	Clock Run-In, Framing	Bytes 1 to 5 as in Sections 9 and 10. Code and Packet Address	
14.8.2	Designation Code	Byte 6, 4 bits data plus 4 bits Hamming protection. Data bits set to 0000.	
14.8.3	Data Groups	Bytes 7 to 45 used as 13 groups of 18 bits data and 6 bits Hamming protection. Bits 1 to 8 of the first group of 18 data bits in these packets with Y=28 are set to '0'. Bits 9 to 18 are set according to figure 13 (a) and (b). 16 data words of 12 bits each, followed by 4 data words of 5 bits, and a data word of 2 bits, plus two final bits set to '0' are provided by the following sequence of 12 groups of 18 data bits.	Bytes 7 to 36 used as 10 groups of 18 bits data and 6 bits Hamming protection. Byte 37 is reserved. Bits 1 to 8 of the first group of 18 data bits in these packets with Y=28 are set to '0'. Bits 9 to 18 are set according to figure 13 (a) and (b). 16 data words of 12 bits each, followed by 4 data words of 5 bits, and a data word of 2 bits are provided. The first 13 data words of 12 bits each and then 6 bits set to '0' are transmitted by the 9 groups of 18 data bits in packet X/0/28. The final 3 data words of 12 bits each, followed by 4 data words of 5 bits each and a data word of 2 bits, and then 14 bits set to '0' is transmitted in the 2nd, 3rd, 4 th and 5th groups of 18 data bits in packet X/1/28. The remaining 5 groups of 18 data bits in packet X/1/28 are set to '0'.

14.8.3.1	Colour Map Entry Coding	The 16 data words of 12 bits, each define a colour in the Colour Map of figure 7, proceeding in transmission order from entry 16 to entry 31. Each 12 bit data word includes 4 bits for each primary colour, red, green and blue, in the transmission order: RRRRGGGGBBBB, with ascending order of bit significance.
14.8.3.2	Colour Look-Up Table (DCLUT) for Dynamically Redefinable Character Sets	The 4 data words of 5 bits, each define one of the 4 entries in the Colour Look-Up Table (DCLUT), for Dynamically Redefinable Character Sets (DRCS see Section 16). The transmission order is least significant bit first.
14.8.3.3	Invokation of Colour Tables for Use with Spacing Attributes.	The 2 bit data word invokes one of the four Colour Tables to be used with spacing attributes, see figure 7. The transmission order is least significant bit first.

14.9	Designation of Character Sets	Character Sets are designated to the Code Tables G0, G1, G2 and G3 and are defined using the data in packet X/28. Equipment intended for operation with only a single group of character sets may ignore this data. For the recommended transmission order of packets with Y=26, Y=27 and Y=28, see Appendix 1.	Character Sets are designated to the Code Tables G0, G1, G2 and G3 and are defined using the data in packet X/0/28. Equipment intended for operation with only a single group of character sets may ignore this data. For the recommended transmission order of packets with Y=26, Y=27 and Y=28, see Appendix 1.
14.9.1	Clock Run-In, Framing Code and Packet Address	Bytes 1 to 5 inclusive, see Sections 9 and 10.	
14.9.2	Designation Code	Byte 6, 4 bits data plus 4 bits Hamming protection. Data bits set to 0001.	
14.9.3	Data Groups	Bytes 7 to 45 used as 13 groups of 18 bits data and 6 bits Hamming protection. The first two data groups are used for this application. The remaining data groups are reserved.	Bytes 7 to 36 used as 10 groups of 18 bits data and 6 bits Hamming protection. Byte 37 is reserved. The first two data groups are used for this application. The remaining data groups are reserved.
14.9.3.1	Coding for Character Set Designation Bit Allocation	The 18 data bits of the first three byte data group are allocated as follows: (1) Set to '0' 2 bits (2) Character Set Code of G0 Table 7 bits see figure 14 (3) Set to '0' 1 bit (4) Character Set Code of G1 Table 7 bits see figure 14 (5) Set to '0' 1 bit The 18 data bits of the second three byte data group have the same allocation but (2) designates a G2 Code Table and (4) a G3 Code Table, see figure 14. The interpretation of the 7 character code bits is shown in figure 14. The bits are transmitted least significant bit first. In the case of the G0 Set, up to 8 options may be designated with the G0 set and invoked by the page header control bits C12, C13 and C14, see Section 14.1.2. The designation of character sets to an associated group of code tables must take into account the relationships between them, avoiding incompatibility. Some codes in figure 14 permit simultaneous designation of more than one G0 set. Each may have options specified, provided that the total number of options does not exceed 8.	

14.10	Data Applicable to All Pages in a Magazine	Data applying to all the pages in a magazine is included in packets with Y=29. Where page applicable data is included in packets associated with a specifically addressed page, this shall take precedence over the corresponding data in packets with Y=29.	
14.10.1	Clock Run-In, Framing Code and Packet Address	Bytes 1 to 5 as Sections 9 and 10.	
14.10.2	Designation Code	Byte 6, 4 bits data plus 4 bits Hamming protection.	
14.10.3	Colour Dynamic Redefinition	The Designation Code is set to 0000. The Colour Map may be redefined, Colour Look-Up Table entries specified and an alternative Colour Table invoked for all pages in the magazine addressed by a packet with Y=29. The coding details follow those in Sections 14.8.1 to 14.8.3.3.	
14.10.4	Designation of Character Sets	The Designation Code is set to 0001. Character sets may be designated to the Code Tables G0, G1, G2 and G3 for all pages in the magazine addressed by a packet with Y=29. The coding details follow those in Sections 14.9.1 to 14.9.3.1.	
14.10.5	Magazine Inventory Page	The Designation Code is set to 0100	
14.10.5.1	Data Groups	Bytes 7 to 45 as 13 groups of 18 bits data and 6 bits Hamming protection.	Bytes 7 to 36 used as 10 groups of 18 bits data and 6 bits Hamming protection. Byte 37 is reserved.
14.10.5.2	Page Address of Inventory Page	First 2 groups of 3 bytes containing: Continuity Indicator...2 most significant bits Set to '0'.....1 bit Page Number.....8 bits Page Sub-Code.....13 bits Continuity Indicator..12 least significant bits Hamming Protection....12 bits See figures 78(a) and 78(b). The default address for this page when a packet with Y=29 is not transmitted is FE3F7E. The remaining 3 byte data groups are reserved.	The Continuity Indicator shall have the same value as in the associated Inventory Page. When this form of a packet with Y=29 is transmitted but no Inventory page is included, the page and sub-code addresses shall be set to FF3F7F and the Continutity Indicator to 0.

14.11	Two Byte Character Coding -Ideographic characters	Ideographic characters are coded using two contiguous bytes. The characters normally occupy a rectangle equivalent to a double size single byte coded character. The display format is 20 character positions per display row and 12 rows per displayed page.
14.11.1	Ideographic Character Display - Default Format	The origin of a character is the top left hand equivalent single byte character position. The origin of a character may be on any display row (starting with row 0) except where part of the character would extend beyond the normal display area. In the default condition, the origin of a character may be at even numbered character positions, starting with character position 0. Any character obscured in part or entirely by a character with its origin in a display row with a lower row number shall not be displayed.
14.11.1.1	Spacing Display Attributes Other Than Mosaics	The spacing attributes of figure 5, other than characters 01 to 05, may be used. To preserve the display format they must occur in pairs. These pairs may comprise two different characters or the same character repeated. A character has the attributes applicable to its origin. When characters are displayed double height, double width or double size the rules of Section 14.5.2 apply.
14.11.1.2	Mosaic Display Mode Spacing Invokation	When the mosaic display mode is invoked by the use of a spacing attribute character (01 to 05 of figure 5), the total number of characters in that mode, including the attribute control character or characters and the characters for display must be even. A padding character must be inserted should the total be an odd number.

14.11.2	Character Origin - Position in Row	The data in Packets with Y=26 is used as in Section 14.6.6 to effect a shift to a single byte character set. The use of single shift (see Sections 14.6.6.7 and 14.6.6.8), or a latching shift (see Sections 14.6.6.5 and 14.6.6.6) including an odd number of characters has the effect of changing the origin of a two byte character from an even to an odd numbered display position. A character shall not be given an origin, such that part of the character extends outside the normal display area.
14.11.3	Non Spacing Display Attributes	The full range of non spacing display attribute controls of Section 14.6 may be used.
14.11.4	Character SPACE	The single byte character SPACE (2/0) transmitted twice contiguously, or the character SPACE from the invoked two byte code table have a similar effect. These characters are only explicitly effective in the addressed display row. The equivalent positions in the following row are available for displaying characters transmitted in the packet addressing that row. Depending upon the mode invoked by that packet, they may be single byte coded characters or a two byte coded character.

14.12	Ideographic Characters - Downloading to a Designated Character Set Using Pseudo Pages	Pseudo Pages of this type include data that define up to 24 characters for downloading to a designated 2-byte character set, for use with a specified page or pages. To prevent independent display of data intended for downloading, the header control bits C7 (Suppress Header) and C10 (Suppress Display), in the header packet (Y=0) of the pseudo page may be set to 1.	
14.12.1	Linking from Pages for Display to Pseudo Pages for Character Downloading	Linking to a pseudo page for character set downloading is by means of the data in packet X/27 of the page for display see Section 12.	Linking to a pseudo page for character set downloading is by means of the data in packet X/0/27 of the page for display see Section 12.
14.12.2	Clock Run-In, Framing Code and Packet Address	Bytes 1 to 5 as in Sections 9 and 10.	
14.12.3	Designation of a Pseudo Page for Character Downloading	There shall be a packet with Y=28 and the Designation Code set to 0000.	There shall be a packet with Y=28 and the Designation Code set to 0000.
14.12.3.1	Mode Definition of Pseudo Pages for Character Downloading	Two pseudo pages are required for the complete range of 24 2-byte code table addresses. For the 12 numerically lowest addresses, bits 8 to 1 of the first group of 18 data bits are set, in that order to 10000010. The remaining bits are set to 0. For the remaining 12 addresses, bits 8 to 1 of the first group of 18 data bits are set, in that order to 10000011. The remaining bits are set to 0. See figure 13.	

14.12.4	Character Coding for Downloading	Characters are downloaded using Pattern Transfer Units (PTU) of 20 bytes each. Each packet X/1 to X/24 carries 2 PTUs in a defined format of 20 plus 20 bytes, proceeding in time through the packet.	Characters are downloaded using Pattern Transfer Units (PTU) of 20 bytes each. Each packet X/0/1 to X/0/24 carries the first of a pair of PTUs plus the initial 12 bytes of the second PTU of the pair in a defined format. The data for the final 8 bytes of each of 4 pairs of PTUs is carried by packets with the Tabulation bit T set to 1 (X/1/Y), in a defined format. The packet number of a packet of the form X/1/Y corresponds to the first of the group of 4 pairs of PTUs, taking into account the following for packets with Y=1 and Y=24. The data for the 8 final bytes of PTUs carried by packets with Y=1 to Y=3 are carried by packet X/1/1. Since the packet with Y=0 does not carry PTUs, the data carried in bytes 6 to 13 of packet X/1/1 is ignored, for this downloading function. The final 24 bytes of the packet X/1/24 are ignored since there are not related packets with T=0 carrying PTUs.
14.12.4.1	Byte Coding for Pattern Transfer Units (PTU)	The data bytes defining a PTU use the transmission codes 4/0 to 7/15. Each byte thus defines the value of 6 bits of a PTU and is called a D-byte.	
14.12.4.2	Downloaded Ideographic Character Format	Format PTUs/Character Bytes/Character 24x20x1 4 80 Format is: Horizontal Dots x Vertical Dots x Bits/Pixel Each PTU defines a quarter of the character area. The transmitted sequence of 4 PTUs represent respectively the top left, top right, bottom left and bottom right quarters. Up to 96 PTUs may be downloaded using two pseudo pages. These relate to positions in the 2-byte code table defined by the data in the packet with Y=28 of the Pseudo page, see Section 14.12.4.3. Unused packets need not be transmitted.	

14.12.4.3	Downloaded Characters Code Table	The characters are addressed to the code table that is invoked or is the default for the basic page, when no single or latching shifts are in operation.	
14.12.4.4	Downloaded Characters Code Table Addressing	The location in the addressed code table for the 12 characters that can be downloaded by each pseudo page is defined by the data in the associated packet with Y=28. The second and following 3 byte groups that each include 18 data bits, relate respectively to the sequence of groups of 4 PTUs that each define a character.	The location in the addressed code table for the 12 characters that can be downloaded by each pseudo page is defined by the data in the associated packet with Y=28. Byte 37 is reserved. In the packet X/0/28, the second and following 3 byte groups, that each include 18 data bits, relate respectively to the sequence of groups of 4 PTUs that define the first 9 of the 12 characters. In the packet X/1/28, the second and following two 3 byte groups, that each include 18 data bits, relate respectively to the sequence of 3 groups of 4 PTUs that define the final 3 characters.
14.12.4.4.1	Code Table Addressing - Bit Allocation	The 18 bits in the three byte data groups defined in Section 14.12.4.4 are set as follows: (1) 4 bits set to 0 data is included in the pseudo page defining the corresponding character set to 1 no data is transmitted in the pseudo page defining the corresponding character, any character already defined persists. (2) 7 bits define the row, 1 to 94 in the 2-byte code table. (3) 7 bits define the column, 1 to 94 in the 2-byte code table. In items 2 and 3 above the order is most significant bit first. Values of bit combinations equal to 0 or greater than 94 shall be interpretated as 'no corresponding character data transmitted'.	

14.13	Two Byte Character Coding - Han'gul (Korean) Alphabet Application	This alphabet is coded using two contiguous bytes, by associating groups of letters into syllabic characters. The characters normally occupy a rectangle equivalent to a double size single byte coded character. The display format is 20 character positions per display row and 12 rows per displayed page.
14.13.1	Han'gul Syllabic Coding	The Korean 2-byte code table (figure 56): Rows 0, 1, 2 and 4 include characters that are not part of the Han'gul alphabet. Row 3 includes the 40 letters of the Han'gul alphabet for non-syllabic presentation. Rows 21 and 22 are reserved as addresses for ideographic characters dowloaded according to Section 14.12. Rows 23 to 127 contain Han'gul open syllables (ending in vowel) and closing consonants, including a NUL closing consonant, used to terminate an open syllable. In this area of the code table, the 14 active bits of each 2-byte group are divided into a first and second data word of 9 and 5 bits respectively. The data word of 9 bits defines an open syllable character. The data word of 5 bits, that are the most significant bits of the second byte, define a closing consonant. When the syllable is open the NUL character is transmitted. When a closed syllable is to be displayed, the open syllable component is displayed at half height and the closing consonant occupies the lower half of the character space.
14.13.2	Character Display - Default Format	The origin of a character is the top left hand equivalent single byte character position. The origin of a character may be on any display row (starting with row 0) except where part of the character would extend beyond the normal display area. In the default condition, the origin of a character is at an even numbered character position (starting with character position 0). Any character obscured in part or entirely by a character with its origin in a display row with a lower row number shall not be displayed.

14.13.3	Spacing Display Attributes	The spacing attributes of figure 5 are included in row 0 of the code table and have the coding of figure 5 in the second byte. For the mosaic mode see Section 14.13.3.1. A character has the attributes applicable to its origin. When characters are displayed double height, double width or double size the rules of Section 14.5.2 apply.
14.13.3.1	Mosaic Display Mode Spacing Invokation	When the mosaic display mode is invoked by the use of a spacing attribute character (01 to 05 of figure 5), the mosaic characters are displayed with the same format as other characters in the code table of figure 56, equivalent to a double size single byte character.
14.13.4	Character Origin - Position in Row	The data in Packets with Y=26 is used as in Section 14.6.6 to effect a shift to a single byte character set. The use of single shift (see Sections 14.6.6.7 and 14.6.6.8), or a latching shift (see Sections 14.6.6.5 and 14.6.6.6) including an odd number of characters has the effect of changing the origin of a two byte character from an even to an odd numbered display position. A character shall not be given an origin, such that part of the character extends outside the normal display area.
14.13.5	Non Spacing Display Attributes	The full range of non spacing display attribute controls of Section 14.6 may be used.
14.13.6	Character SPACE	This character is only explicitly effective in the addressed display row. The equivalent positions in the following row are available for displaying characters transmitted in the packet addressing that row. Depending upon the mode invoked by that packet, they may be single byte coded characters or a two byte coded character.

PSEUDO PAGES

15	Pseudo Pages	Pseudo Pages carry data that is intended to be associated with a standard page or pages. To prevent independent display of a pseudo page without the associated page, control bits C7 (Suppress Header) and C10 (Suppress Display), in the header packet (Y=0) may be set to 1.	
15.1	Linking to Pseudo Pages from an Associated Page	Linking to a pseudo page from the associated page is by means of the data in packet X/27 of the associated page, see Section 12.	Linking to a pseudo page from the associated page is by means of the data in packet X/0/27 of the associated page, see Section 12.
15.2	Clock Run-In, Framing Code and Packet Address	Bytes 1 to 5 as in Sections 9 and 10.	
15.3.	Overwriting Pseudo Pages		
15.3.1	Designation of an Overwriting Pseudo Page	There shall be a packet X/28 with the Designation Code set to 0000. The first group of 18 data bits shall be set designating the overwriting mode, see figure 13. Other data bits set to '0'.	There shall be a packet X/0/28 with the Designation Code set to 0000. Byte 37 is reserved. The first group of 18 data bits shall be set designating the overwriting mode, see figure 13. Other data bits set to '0'.
15.3.2	Invokation of Overwriting Modes	The default character set of an overwriting pseudo page is the G0 primary character set that is the default, or that designated for standard pages. Other character sets may be invoked for a pseudo page, using packets with Y=28, designation code 0001, as in Section 14.9. Character sets are invoked by the transmission of the appropriate Row and Space Mode Description Groups in packets with Y=26 of the pseudo page, see figure 12 and 12(a), and Sections 14.6 and 14.7. The invoked character set persists until the end of a display row or until overridden by the transmission of a further invokation in a packet with Y=26.	

15.4	Scrolling Data from a Pseudo Page	When the scrolling function of Section 14.6.9 is activated, the data to be scrolled through the scrolling region may be carried by a pseudo page.	
15.4.1	Designation of a Scrolling Pseudo Page	There shall be a packet X/28 with the Designation Code set to 0000. The first group of 18 data bits shall be set designating the scrolling mode, see figure 13. Other data bits are set to 0. The number of pseudo pages required for the scrolling function may be linked by using packet X/27 of the pseudo page The associated page introducing the scrolling function is linked as in Section 15.1.	There shall be a packet X/0/28 with the Designation Code set to 0000. The first group of 18 data bits shall be set designating the scrolling mode, see figure 13. Other data bits are set to 0. Byte 37 is reserved. The number of pseudo pages required for the scrolling function may be linked by using packet X/0/27 of the pseudo page The associated page introducing the scrolling function is linked as in Section 15.1.
15.5	Page Format Extension Using Pseudo Pages	The format of a displayed page may be extended, both horizontally and vertically using data carried by pseudo pages. The horizontal extension can be by up to 3 multiples of 40 characters, i.e. 160 characters per displayed row. The vertical extension can be by up to 3 multiples of 25 rows, i.e the page header plus 100 rows, providing 101 row per displayed page.	
15.5.1	Linking to Extended Format Pages from Standard Pages	Linking to a pseudo page for page extension, from a standard page is as in Section 15.1. For this application the standard page may not include any data for display but only a suppressed header and one or more packets with Y=27. It is to be noted that it is not necessary to introduce an extended page with a standard page. The first pseudo page of the group forming the extended page can be acquired directly.	

15.6	Designation of Pseudo Pages for Page Format Extension	There shall be a packet X/28 with the Designation Code set to 0000. The first group of 18 data bits shall be set designating the page format extension mode, see figure 13, other data bits are set to 0. These bits also define the position of the pseudo page in the array forming the complete page The termination of the format extension process is defined by the inclusion in the final pseudo page of the group, of a packet with Y=27, in which the link control data indicates format extension associated with the NUL page address FF3F7F.	There shall be a packet X/0/28 with the Designation Code set to 0000. The first group of 18 data bits shall be set designating the page format extension mode, see figure 13, other data bits are set to 0. Byte 37 is reserved. These bits also define the position of the pseudo page in the array forming the complete page The termination of the format extension process is defined by the inclusion in the final pseudo page of the group, of a packet with Y=27, in which the link control data indicates format extension associated with the NUL page address FF3F7F.
15.7	Reformatted Data by Pseudo Pages	An arbitrary data stream may be reformatted into pseudo pages, using the 1024 data bytes available in row 0 to 25 of a pseudo page. Adequate buffer storage must be available to ensure at least two transmissions of any such pseudo page where the input data stream is subject to dynamic changes. The reformatting protocols are defined with the specification of the data type involved, or shall be the subject of agreement between the origination and reception ends of the transmission process.	
15.7.1	Linking to Reformatted Data Pseudo Page from a Standard Page	Linking to a pseudo page carrying data to be reformatted, from a standard page is as in Section 15.1. For this application the standard page may not include any data for display but only a suppressed header and one or more packet with Y=27, see figure 2(d). However it is not necessary to introduce a pseudo page carrying data to be reformatted with a standard page. The first pseudo age of a linked group may be acquired directly.	
15.7.2	Designation of Pseudo Pages for Carrying Data to be Reformatted	There shall be a packet X/28 with the Designation Code set to 0000. The first group of 18 data bits shall be set designating the Reformatted Data mode, see figure 13. Other data bits set to 0.	There shall be a packet X/0/28 with the Designation Code set to 0000. The first group of 18 data bits shall be set designating the Reformatted Data mode, see figure 13. Other data bits set to 0. Byte 37 is reserved.

PRESENTATION LEVEL THREE

16	Dynamically Redefinable Character sets - Downloading Using Pseudo Pages	Pseudo Pages of this type include data that define downloadable character sets for use with a specified page or pages. To prevent independent display of data intended for downloading, the header control bits C7 (Suppress Header) and C10 (Suppress Display), in the header packet (Y=0) of the pseudo page may be set to 1.	
16.1	Linking from Pages for Display to Pseudo Pages for Character Set Downloading	Linking to a pseudo page for character set downloading is means of the data in packet X/27 of the page for display, see Section 12.	Linking to a pseudo page for character set downloading is means of the data in packet X/0/27 of the page for display, see Section 12.
16.2	Clock Run-In, Framing Code and Packet Address	Bytes 1 to 5 as in Sections 9 and 10.	
16.3	Designation of a Pseudo Page for Character Set Downloading	There shall be a packet with Y=28 and the Designation Code set to 0000.	There shall be a packet with Y=28 and the Designation Code set to 0000.
16.3.1	Mode Definition of Pseudo Pages for Character Set Downloading	Two pseudo pages are required for the complete range of DRCS code table addresses. For addresses 2/0 to 4/15 the first group of 18 data bits are set with bit 8 set to1 and the remaining bits set to 0. For Addresses 5/0 to 7/15, bits 8 and 1 are set to 1 and the remaining bits are set to 0, see figure 13.	

<table>
<tr><td>16.4</td><td>Character Coding for Downloading</td><td>Characters are downloaded using Pattern Transfer Units (PTU) of 20 bytes each. Each packet X/1 to X/24 carries 2 PTUs in a defined format of 20 plus 20 bytes, proceeding in time through the packet.</td><td>Characters are downloaded using Pattern Transfer Units (PTU) of 20 bytes each. Each packet X/0/1 to X/0/24 carries the first of a pair of PTUs plus the initial 12 bytes of the second PTU of the pair in a defined format.
The data for the final 8 bytes of each of 4 pairs of PTUs is carried by packets with the Tabulation bit T set to 1 (X/1/Y), in a defined format.
The packet number of a packet of the form X/1/Y corresponds to the first of the group of 4 pairs of PTUs, taking into account the following for packets with Y=1 and Y=24.
The data for the 8 final bytes of PTUs carried by packets with Y=1 to Y=3 are carried by packet X/1/1. Since the packet with Y=0 does not carry PTUs, the data carried in bytes 6 to 13 of packet X/1/1 is ignored, for this downloading function.
The final 24 bytes of the packet X/1/24 are ignored since there are not related packets with T=0 carrying PTUs.</td></tr>
<tr><td>16.4.1</td><td>Byte Coding for Pattern Transfer Units (PTU)</td><td colspan="2">The data bytes defining a PTU use the transmission codes 4/0 to 7/15.
Each byte thus defines the value of 6 bits of a PTU and is called a D-byte.</td></tr>
<tr><td>16.4.2</td><td>Dynamically Redefinable Character Sets (DRCS) Character Modes</td><td colspan="2">
<table>
<tr><th>Mode</th><th>Format</th><th>PTUs/Character</th><th>Bytes/Character</th></tr>
<tr><td>(1)</td><td>12x10x1</td><td>1</td><td>20</td></tr>
<tr><td>(2)</td><td>12x10x2</td><td>2</td><td>40</td></tr>
<tr><td>(3)</td><td>6x10x1</td><td>0.5</td><td>10</td></tr>
<tr><td>(4)</td><td>6x10x2</td><td>1</td><td>20</td></tr>
<tr><td>(5)</td><td>6x10x4</td><td>2</td><td>40</td></tr>
<tr><td>(6)</td><td>6x 5x2</td><td>0.5</td><td>10</td></tr>
<tr><td>(7)</td><td>6x 5x4</td><td>1</td><td>20</td></tr>
</table>
Format is: Horizontal Dots x Vertical Dots x Bits/Pixel

Up to 96 PTUs may be downloaded using two pseudo pages and these relate directly to the 96 code table addresses for DRCS, 2/0 to 7/15. Unused packets need not be transmitted and unused addresses may be padded with the character SPACE (2/0).</td></tr>
</table>

16.4.3	Downloading Modes	From the number of PTUs required for the various formats (see section 16.4.2), the following transmission modes are derived and identified: Format — Mode Identification 12x10x1 — 0000 12x10x2 — 0001 6x 5x2 (1st DRCS) 6x 5x2 (2nd DRCS) — 0010 6x10x1 (1st DRCS) 6x 5x2 (2nd DRCS) — 0011 6x 5x2 (1st DRCS) 6x10x1 (2nd DRCS) — 0100 6x10x1 (1st DRCS) 6x10x1 (2nd DRCS) — 0101 6x10x2 — 0110 6x10x4 — 0111 6x5x4 — 1000 The Mode Identification Code 1111 indicates that no data is transmitted for the corresponding character and any character already defined persists.	
16.4.4	Downloading Mode Invokation	The Downloading Mode may be specified individually for each character. The mode for the character is invoked by the second and following groups of 18 data bits in the packet with Y=28 associated with the pseudo page or pair of pseudo pages. The first 192 bits in the data groups are used to transmit the 48 Mode Identification Codes, see Section 16.4.3, required for each pseudo page used for DRCS downloading. The remaining data bits are set to 0.	The Downloading Mode may be specified individually for each character. The Mode for the character is invoked by the second and following groups of 18 data bits in the packet with Y=28 associated with the pseudo page or pair of pseudo pages. The first 160 bits in the packet X/0/27 are used to transmit the first 40 mode Identification Codes required for each pseudo page used for DRCS downloading, see Section 16.4.3. The two remaining bits are set to 0. The first 32 bits in the packet X/1/28 are used to transmit the final 8 Mode Identification Codes required for each pseudo page used for DRCS downloading, see Section 14.6.4. The remaining bits are set to 0.

16.4.5	DRCS Code Table Organisation	The packet addresses relate directly to positions in the code table. The first PTU in packet X/1 of the first of the pair of downloading pseudo pages, includes dot data for character 2/0. The next PTU includes data for character 2/1 and so on. The second pseudo page begins with the first PTU of its packet X/1 including dot data for character 5/0 and continuing to character 7/15.	The packet addresses of packets with Tabulation bit T set to 0 relate directly to the position in the code table. The first PTU in packet X/0/1 of the first of the pair of downloading pseudo pages, includes dot data for character 2/0. The next PTU includes data for character 2/1 and so on. The second pseudo page begins with the first PTU of its packet X/0/1 including dot data for character 5/0 and continuing to character 7/15.
16.4.6	Byte Downloading Organisation	The byte organisation in the pseudo page depends upon the character modes and the associated downloading modes to be included in the DRCS, see figure 16.	
16.4.6.1	Character Mode (1) 12x10x1(Basic Mode) Mode Identification 0000	The dots of a character are loaded 6 at a time from each D-byte, using the 6 least significant bits form codes 4/0 to 7/15. Loading proceeds from the top left hand corner, left to right, row by row, the most significant bit of each 6 corresponding to the left hand dot. One PTU is required for each 12x10x1 character.	
16.4.6.2	Character Mode (2) 12x10x2 Mode Identification 0001	The first bit plane is downloaded as for the basic mode, see Section 14.4.6.1. The second bit plane is downloaded using the next 20 D-byte group. The address in the DRCS code table corresponds to the first 20 D-byte group defining the character. Four colours are available for display, from the DRCS Colour Look-Up Table (DCLUT), downloaded as in Section 14.8.4. The first bit plane correspond to the least significant bit of the DCLUT address and the second bit plane corresponds to the most significant DCLUT address bit.	
16.4.6.3	Character Mode (6) 6x5x2 - Two Co-Defined Character Sets Mode Identification 0010	Downloading proceeds as for the basic mode, see Section 16.4.6.1, except that alternate D-bytes respectively define equivalent dots of the first and second sets to be downloaded. Two bit planes are downloaded for each character. Four colours are available for display, from the DRCS Colour Look-Up Table (DCLUT), downloaded as in Section 14.8.4. The first bit plane downloaded, corresponds to the least significant bit of the DCLUT address and the second bit plane downloaded corresponds to the most significant DCLUT address bit.	

16.4.6.4	Character Mode (3) 6x10x1 and Character Mode (6) 6x5x2 as Two Co-Defined Character Sets Mode Identification 0011	Downloading proceeds as for the basic mode, see Section 16.4.6.1, except that alternate D-bytes respectively define equivalent dots of the first and second set to be downloaded. For the second of the pair of character sets, two bit planes are downloaded for each character and four colours are available for display, from the DCLUT, downloaded as in Section 14.8.4. The first bit plane downloaded corresponds to the least significant bit of the DCLUT address and the second bit plane downloaded corresponds to the most significant DCLUT address bit.
16.4.6.5	Character Mode (6) 6x5x2 and Character Mode (3) 6x10x1 as Two Co-Defined Character Sets Mode Identification 0100	Downloading is as in Section 16.4.6.4 except that the first and second character set downloading procedure is interchanged.
16.4.6.6	Character Mode (3) 6x10x1 - Two Co-Defined Character Sets Mode Identification 0101	Downloading proceeds as for the basic mode, see Section 16.4.6.1, except that alternate D-bytes respectively define equivalent dots of the first and second sets to be downloaded.
16.4.6.7	Character Mode (4) 6x10x2 Mode Identification 0110	Downloading proceeds as for the basic mode, see Section 16.4.6.1, except that the sequence of D-bytes define respectively the least and most significant bits of the DCLUT address. The DCLUT is downloaded as in Section 14.8.4.
16.4.6.8	Character Mode (5) 6x10x4 Mode Identification 0111	Two PTUs are required to define a character in this mode. Downloading proceeds as for the basic mode, see Section 16.4.6.1, except that the sequence of D-bytes of the first PTU defines respectively the first and second bit planes. The sequence of D-bytes of the second PTU defines respectively the third and fourth bit planes. The four bit planes define the addresses in colour tables 3 and 4 of the colour map, the first bit plane corresponding to the least significant address bit and so on.
16.4.6.9	Character Mode (7) 6x5x4 Mode Identification 1000	Each group of four D-bytes within the PTU defines respectively the first, second, third and fourth bit planes of a character. The four bit planes define the addresses in colour tables 3 and 4 of the colour map, the first bit plane corresponding to the least significant address bit and so on.

17	Alphageometric Displays	There may be an introductory page that is not part of the alphageometric page. The introductory page shall at least include a header packet with Y=0 and a packet or packets with Y=27, designation codes 0100 to 0111 (see Section 12.1.4) to provide links to the alphageometric page for display. These links point to pseudo pages carrying Geometric Instructions and when required pseudo pages for Overwriting. These latter carry alphamosaic characters for insertion into the geometric display. The type of pseudo page is identified by the data in packets with Y=28 of those pages.
17.1	Pages for Alphageometric Display	The data for display is carried by pseudo pages of two types: (a) Overwriting Pseudo pages. These pseudo pages are as defined in Section 15.3 and carry alphamosaic character data for association with a geometric display. (b) Pages of reformattable data carrying geometric data. Four modes, with increasing display features are defined corresponding to Service Profiles 0, 1, 2 and 3 of the CEPT Videotex Presentation Layer Syntax Part 2 (Geometric Display). There are two options for the association of the alphamosaic and geometric components of the page: Option 1 defines the geometric display plane as transparent to the lower alphamosaic character plane. Option 2 inserts the alphamosaic characters into the plane of the geometric display. The display may thus be considered to be derived from a single plane. The selection of a mode defining a profile and Option 1 or 2 is by means of the data in the packet with Y=28 of the pseudo page carrying the geometric data.
17.2	Pseudo Pages Carrying Geometric Data	In a pseudo page carrying geometric data, the header packet with Y=0 shall have the Suppress Header control bit C7 and the Inhibit Display control bit C10 both set to 1. Packets with Y=1 to Y=25 carry the geometric data according to CEPT Videotex Presentation Layer Syntax Part 2 (Geometric Display). The Service Profile, Display Option and method of bit coding is defined by the 18 data bits of the first three byte data group of the packet with Y=28, see figure 13 (a) and (b). More than one pseudo page may be required for the geometric data for a displayable page. In this case, the pseudo pages are linked by the data in a packet with Y=27. Unused packets need not be transmitted and incomplete packets shall be filled with the character 0/0.

18	Alphaphotographic Displays	There may be an introductory page that is not part of the alphaphotographic page. The introductory page shall at least include a header packet with Y=0 and a packet or packets with Y=27, designation codes 0100 to 0111 (see Section 12.1.4) to provide links to the alphaphotographic page for display. These links point to pseudo pages carrying Pixel data and when required pseudo pages for Overwriting. These latter carry alphamosaic characters and geometric patterns for insertion into the photographic display. The type of pseudo page is identified by the data in packets with Y=28 of those pages.
18.1	Pages for Alphaphotographic Display	The data for display is carried by pseudo pages of three types: (a) Overwriting Pseudo pages. These pseudo pages are as defined in Section 15.3 and carry alphamosaic character data for association with a photographic display. (b) Geometric Coded pages for association with a photographic display. (c) Reformattable pages carrying pixel data. The picture coding method is defined by the data in a packet with Y=28 of the pseudo page, according to ISO DP9281 Identification of Picture Coding Methods. There are two options for the association of the alphamosaic, geometric and photographic components of the page: Option 1 defines the photographic display plane as transparent to the lower alphamosaic and geometric character plane or planes. Option 2 inserts the alphamosaic characters and geometric pattern into the plane of the photographic display. The selection of the photographic mode and Option 1 or 2 is by means of the data in the packet with Y=28 of the pseudo page carrying the photographic data.

18.2	Pseudo Pages Carrying Photographic Data	In a pseudo page carrying photographic data, the header packet with Y=0 shall have the Suppress Header control bit C7 and the Inhibit Display control bit C10 both set to 1. Packets with Y=1 to Y=25 carry the pixel data according to the selected picture coding method. The Photographic mode, Display Option and method of bit coding is defined by the 18 data bits of the first three byte data group of the packet with Y=28, see figure 13 (a) and (b).
18.2.1	The Method of Picture Coding	The method of picture coding is identified using the second and subsequent three byte data groups in the packet with Y=28 of the pseudo page. Two characters according to ISO DP9281 are included in each three byte group of 18 data bits, with the final 4 data bits are set to '0'. More than one pseudo page may be required for the pixel data for a displayable page. In this case, the pseudo pages are linked by the data in a packet with Y=27. Unused packets need not be transmitted and incomplete packets shall be filled with the character 0/0.

DATA FOR PROCESSING

19	Data for Processing	The inclusion of data for processing is signalled by means of the data in Packets with Y=27, see Section 12.
19.1	Starting Position of Data for Processing	The data for processing on the the Page starts with the code 1/11, which may be in any of the bytes on the Page. Any bytes before this code are not for processing but may be displayed
19.2	Selection of Protocols	The codes following the 1/11 code determine the decoding Protocol that is in use. There may be any number of codes of the form 3/x, followed by any number of codes of the form 2/x, followed by a code of the form 7/x, where x is in the range 0 to 15. The protocol defined by these code sequences are shown in figure 22.

CONDITIONAL ACCESS - PAGE FORMAT DATA

20	Conditional Access Teletext Service	There may be an introductory page of non-scrambled text. When no introductory text for display is required, this page shall at least include the header packet with Y=0 and a packet or packets with Y=27 to provide links to the conditional access service. Links are provided in a packet with Y=27, designation codes 0100 to 0111 (see Section 12.4). These point to pages with scrambled text and user equipment addressing pages, as identified by data in packets with Y=28 of those pages. See also figure 19.	
20.1	Pages with Scrambled Text or Scrambled Data	For the purpose of scrambling, two types of pages are defined: (a) Pages other than those containing Reformatted Data or for Terminal Equipment Addressing, as in figure 13(b). The scrambling process is initialised at the start of each packet. Unused packets need not be transmitted. (b) Pages containing Reformatted Data, see figure 13(b). The scrambling process is initialised at the start of each page.	
20.1.1	Pages Not Including Reformatted Data and Not for Terminal Equipment Addressing	The data for transmission in bytes 6 to 45 of packets with Y=1 to Y=25, plus the 18 data bits in each three byte data group for transmission in packets with Y=26, is scrambled, using an encryption algorithm. The numbers of the packets included in a scrambled text page are specified as in Section 20.2.2.3.	The data for transmission in bytes 6 to 37 of packets with Y=1 to Y=25, plus the 18 data bits in each three byte data group for transmission in packets with Y=26, is scrambled, using an encryption algorithm. The numbers of the packets included in a scrambled text page are specified as in Section 20.2.2.3. The effect of the Tabulation bit T is defined in Sections 11.2.1 and 14.6.2.
20.1.1.1	Parity Protected 7-bit Data	To provide a sequence of complete bytes for scrambling when 7 bit data is used, a most significant bit is added. The resulting bytes are scrambled and the respective bit masked before the odd parity bit added.	
20.1.1.2	Data in Packets with Y=26	To provide a sequence of complete bytes for scrambling, the 18 data bits have 6 most significant bits added. The resulting 3 bytes are scrambled and the respective 6 bits masked before Hamming protection bits are calculated and added.	

20.1.2	Pages Including Reformatted Data	The data for transmission in bytes 14 to 37 of packets with Y=0 and bytes 6 to 45 of packets with Y=1 to Y=25 are scrambled using an encryption algorithm. The number of bytes included in the page of scrambled data is indicated according to Section 20.2.2.3.	The data for transmission in bytes 14 to 37 of packets with Y=0 and bytes 6 to 37 of packets with Y=1 to Y=25 are scrambled using an encryption algorithm. The number of bytes included in the page of scrambled data is indicated according to Section 20.2.2.3.
20.1.2.1	Parity Protected 7-bit Data	To provide a sequence of complete bytes for scrambling when 7 bit data is used, a most significant bit is added. The resulting bytes are scrambled and the respective bit masked before the odd parity bit added.	
20.2	Page Key	Descrambling of a scrambled page is by means of a Page Key contained in a packet with Y=28 of a scrambled page.	
20.2.1	Page Key Packet Designation Code	Byte 6, 4 bits data plus 4 bits Hamming protection. Data bits set to 0010.	
20.2.2	Page Key Packet Data Groups	Bytes 7 to 45 used as 13 groups of 18 bits data plus 6 bits Hamming protection See figure 17(a)	Bytes 7 to 36 used as 10 groups of 18 bits data plus 6 bits Hamming protection Byte 37 is reserved. See figure 17(b)
20.2.2.1	Page Key Packet Page Type Definition Code Data Not Encrypted	The first group of 18 data bits shall be set to designate the page type (see figure 13)	Packets with Tabulation bit T set to '0' The first group of 18 data bits shall be set to designate the page type (see figure 13)

20.2.2.2	Page Key Packet Data Groups Bit Allocation Data Encrypted with Current System Key	(1) Service Modes 2 bits Bit 2 Bit 1 0 0 256 Services Non-Tiered 0 1 64 Services Tiered 1 0 256 Services with Credit Tokens 1 1 Not Assigned (2) Set to '0' 6 bits (3) Current System Key 56 bits (4) Service Identification Number 8 bits Service Mode 1 or 3: 8 bits define service number, 0 to 255. or Service Mode 2: 6 most significant bits of 8 bit group define service number 0 to 63. The two least significant bits define the service tier: Bit 2 Bit 1 0 0 Basic Tier 0 1 Basic + Premium Tier 1 0 Basic + Premium + Extra Tier 1 1 Not Assigned (5) Page Key 56 bits (6) Key Value Credit 8 bits fraction Token Units 8 bits whole part	Packets with Tabulation bit T set to '0' (1) Service Modes 2 bits Bit 2 Bit 1 0 0 256 Services Non-Tiered 0 1 64 Services Tiered 1 0 256 Services with Credit Tokens 1 1 Not Assigned (2) Set to '0' 6 bits (3) Current System Key 56 bits (4) Service Identification Number 8 bits Service Mode 1 or 3: 8 bits define service number, 0 to 255. or Service Mode 2: 6 most significant bits of 8 bit group define service number 0 to 63. The two least significant bits define the service tier: Bit 2 Bit 1 0 0 Basic Tier 0 1 Basic + Premium Tier 1 0 Basic + Premium + Extra Tier 1 1 Not Assigned (5) Page Key 56 bits (6) Key Value Credit 8 bits fraction Token Units 8 bits whole part (7) Followed by: Set to '0', not encrypted 18 bits

20.2.2.3	Page Key Packet Data Groups Data Not Encrypted	(1) Continuity Indicator 7 bits Incremented by 1 for each subsequent page with the same service number. (2) Repeat Indicator 1 bit Set to '1' indicates page to be repeated (3a) For Text Pages Packet Flags 26 bits Set to '1' if the packet is present. A flag may indicate a sequence of Packets with Y=26. Least significant packet number is transmitted first. Set to '0' 1 bit (3b) For Reformatted Data Data Length 10 bits Indicates data length in bytes to be descrambled as a decimal number (0=1024 bytes) Set to '0' 17 bits (4) Scrambling Method 5 bits See figure 26(a) (5) In Use System Key Label 8 bits Set to '0' 8 bits (6) Cyclic Redundancy Check Word (see figure 10) 16 bits For text pages (see sections 20.1.1 and 3(a)) the character spaces in packets with Y=0 are assumed to contain the character SPACE (2/0). For Reformatted Data (see sections 20.1.2 and 3b above, the Check Word is calculated over the specified data length.	Packets with Tabulation bit T set to '1' (1) Continuity Indicator 7 bits Incremented by 1 for each subsequent page with the same service number. (2) Repeat Indicator 1 bit Set to '1' indicates page to be repeated (3a) For Text Pages Packet Flags 26 bits Set to '1' if the packet is present. A flag may indicate a sequence of Packets with Y=26. Least significant packet number is transmitted first. Tabulation bit set flag 1 bit (3b) For Reformatted Data Data Length 10 bits Indicates data length in bytes to be descrambled as a decimal number (0=1024 bytes) Set to '0' 17 bits (4) Scrambling Method 5 bits See figure 26(a) (5) In Use System Key Label 8 bits Set to '0' 98 bits (6) Cyclic Redundancy Check Word (see figure 10) 16 bits For text pages (see Sections 20.1.1 and 3(a)) the character spaces in packets with Y=0 are assumed to contain the character SPACE (2/0). For Reformatted Data (see sections 20.1.2 and 3b above, the Check Word is calculated over the specified data length.

20.3	User Addressing Pages	Access to the Page Key contained in a packet with Y=28 of a scrambled page, is by means of the Current and New System Keys. This page contains: (1) Shared User Data Packets encrypted with the Shared Distribution Key (2) Unique User Data Packets encrypted with a key that is unique to the user's equipment (3) System Key Packet encrypted with the New System Key The Shared User Data Packets are transmitted relatively frequently and the Unique User Data Packets relatively infrequently	
20.3.1	User Addressing Page Designation	There shall be a packet with Y=28, with the designation code in byte 6 set to 0010. The first group of 18 data bits shall be set to define the page as a Terminal Equipment Addressing Page, see figure 13. For the remaining data bits in this packet see Sections 20.3.1.1, 20.3.1.2, 20.3.1.3 and 20.3.1.4.	
20.3.1.1	System Key Packet Data Groups	Bytes 7 to 45 used as 13 groups of 18 bits data plus 6 bits Hamming protection See figure 17(c)	Bytes 7 to 36 used as 10 groups of 18 bits data plus 6 bits Hamming protection Byte 37 is reserved. See figure 17(d)
20.3.1.2	System Key Packet Data Not Encrypted	(1) Encryption Method 8 bits (2) Set to '0' 8 bits See figure 26	
20.3.1.3	System Key Packet Data Encrypted with New System Key	(1) New System Key 56 bits (2) Current System Key 56 bits (3) Set to '0' 16 bits	
20.3.1.4	System Key Packet Data Not Encrypted	(1) New System Key Label 8 bits (2) Current System Key Label 8 bits (3) Set to '0' 56 bits	(1) New System Key Label 8 bits (2) Current System Key Label 8 bits (3) Set to '0' 2 bits

20.3.2	Shared User Packets Designation Code	Packet with Y=1 to Y=25, byte 6. 4 bits data plus 4 bits Hamming protection. Data bits set to 0000	
20.3.2.1	Shared User Packets Data Groups	Bytes 7 to 45 used as 13 groups of 18 bits data plus 6 bits Hamming protection. See figure 18(a)	Bytes 7 to 36 used as 10 groups of 18 bits data plus 6 bits Hamming protection, Byte 37 is set to '0' See figure 18(b)
20.3.2.2	Shared User Packets Data Groups Bit Allocation Data Not Encrypted	(1) Shared User Address 20 bits (2) Set to '0' 6 bits Followed by data defined in Section 20.3.2.3	Packets with Tabulation Bit T set to '0' (1) Shared User Address 20 bits Followed by data defined in Section 20.3.2.3
20.3.2.3	Shared User Packets Data Groups Bit Allocation Data Encrypted	This data is encrypted with the Shared Distribution Key, see Section 20.3.3.3 (1) New System Key 56 bits (2) User Enabling Bits 152 bits 0=disabled; 1=enabled	Packets with Tabulation Bit T set to '0' This data is encrypted with the Shared Distribution Key, see Section 20.3.3.3 (1) New System Key 56 bits (2) User Enabling Bits 104 bits 0=disabled; 1=enabled
20.3.3	Unique User Packets	Packets with Y=1 to Y=25. Byte 6, 4 bits data plus 4 bits Hamming protection. Data bits set to 0001	
20.3.3.1	Unique User Packets Data Groups	Bytes 7 to 45 used as 13 groups of 18 data bits plus 6 bits Hamming protection See figure 18(a)	Bytes 7 to 36 used as 10 groups of 18 data bits plus 6 bits Hamming protection. Byte 37 is reserved. See figure 18(b)

20.3.3.2	Unique User Packets Data Groups Bit Allocation Data Not Encrypted	(1) Unique User Address 32 bits (2) Set to '0' 2 bits Followed by data defined in Section 20.3.3.3	Packets with Tabulation Bit T set to '0' (1) Unique User Address 32 bits (2) Set to '0' 68 bits Followed by data defined in Section 20.3.3.3
20.3.3.3	Unique User Packet Data Groups Bit Allocation Data Encrypted with User Equipment Unique Key	(1) Service Mode 2 bits see Section 20.2.2.2 (2) Service Reference Number 2 bits (3) Current or New Shared Address 20 bits (4) Unique Equipment Key 56 bits (5a) Service Modes 1 and 2 7 Service Numbers of 8 bits 56 bits or (5b) Service Mode 3 Total credit tokens Purchased for 2 services: 1st Service number 8 bits Credit Tokens Purchased 20 bits 2nd Service Number 8 bits Credit Tokens Purchased 20 bits (6) Current or New Shared Distribution Key 56 bits (7) Current or New User Enabling Bit Position 8 bits	(1) Service Mode 2 bits see Section 20.2.2.2 (2) Service Reference Number 2 bits (3) Current or New Shared Address 20 bits (4) Unique Equipment Key 56 bits Followed by data defined in Section 20.3.3.3.1

20.3.3.3.1	Unique User Packets Data Groups Bit Allocation Data Not Encrypted	Packets with Tabulation Bit T set to '1' (1) Unique User Address 32 bits (2) Set to '0' 28 bits Followed by data defined in Section 20.3.3.3.2
20.3.3.3.2	Unique User Packets Data Groups Bit Allocaton Data Encrypted with User Equipment Unique Key	(1a) Service Modes 1 and 2 7 Service Numbers of 8 bits 56 bits or (1b) Service Mode 3 Total credit tokens purchased for 2 services: 1st Service number 8 bits Credit Tokens Purchased 20 bits 2nd Service Number 8 bits Credit Tokens Purchased 20 bits (2) Current or new shared Distribution Key 56 bits (3) Current or New User Enabling Bit Position 8 bits The encryption is continuous over the data in related packets having the Tabulation bit T set to '0' or '1'.

20.3.4	Initial Page Numbers of Services	Packets with Y=1 to Y=25. Byte 6, 4 bits data plus 4 bits Hamming protection Data bits set to 0010.	
20.3.4.1	Service and Associated Initial Page Numbers Data Groups	Bytes 7 to 45 used as 13 groups of 18 data bits plus 6 bits Hamming protection See figure 18(a).	Bytes 7 to 36 used as 10 groups of 18 data bits plus 6 bits Hamming protection. Byte 37 is reserved. See figure 18(b).
20.3.4.2	Service and Associated Initial Page Numbers Bit Allocation Data Not Encrypted	Each group of 18 data bits includes (1) Service Number 8 bits (2) Initial Page Number 8 bits (3) Set to '0' 2 bits Any unused groups in a packet are set to '0'.	Packets with Tabulation Bit T set to '0'. Each group of 18 data bits includes (1) Service Number 8 bits (2) Initial Page Number 8 bits (3) Set to '0' 2 bits Any unused groups in a packet are set to '0'.
20.3.5	Independent Data Services Data Channels and Addresses	Packets with Y=1 to Y=25. Byte 6, 4 bits data plus 4 bits Hamming protection Data bits set to 0011.	
20.3.5.1	Data Groups	Bytes 7 to 45 used as 13 groups of 18 data bits plus 6 bits Hamming protection	Bytes 7 to 36 used as 10 groups of 18 data bits plus 6 bits Hamming protection. Byte 37 is reserved.
20.3.5.2	Data Channel Number Bit Allocation Data Not Encrypted	First group of 18 data bits: (1) Data Channel 4 bits see Section 21. (2) Set to '0' 14 bits	
20.3.5.3	Service Number and Address Bit Allocation Data Not Encrypted	Each pair of Groups of 18 data bits includes: (1) Service Number 8 bits (2) Address Length (AL) 3 bits (3) Address 24 bits (4) Set to '0' 1 bit Group repeated for each service number. Any unused groups in a packet are set to '0'.	Packets with Tabulation bit T set to '0'. Each pair of Groups of 18 data bits includes: (1) Service Number 8 bits (2) Address Length (AL) 3 bits (3) Address 24 bits (4) Set to '0' 1 bit Group repeated for each service number. Any unused groups in a packet are set to '0'.

NOTES TO SECTION 20

SECURITY OF CONDITIONAL ACCESS TELETEXT SERVICES

The security of the user addressing process may be optimised by the use of "error extension" techniques.Should any bit of the ciphertext have been changed, this causes the message to be totally corrupted when decrypted with the correct key.

In order to provide the property of "error extension" a cipher feedback technique containing a "one-way function" is used with a multiple of encipherments called "rounds". Each round reverses the order of the previous ciphertext bytes, as shown in figure 20. A typical one-way function having good security is shown in figure 21.

Cipher Feedback Algorithm

The secret key K is loaded into the 64 bit key register K. The 64 bit key is derived from a 56 bit key that forms the 56 least significant bits. For reformatted data pages and data not in page format, the 8 least significant bits of the 56 are used to look up a corresponding 8 bit value from look-up-tables, LUT in figure 21. This value is used as the 8 most significant bits of the 64 bit key. For textual page data, the 8 most significant bits are the magazine and row address of each packet forming the page.

The register R is first loaded with a 64 bit secret initial condition I, that is constant for the particular security device in the equipment. It is a random number having an impulse autocorrelation function. This data word I is loaded into the register R at the begining of each round of the encryption or decryption process.

The encryption and decryption processes are represented in figure 20, the switch being placed in the appropriate positions. The message to be encrypted or decrypted is placed in register A and after the appropriate number of rounds appears in register B. The data in register A is taken, byte by byte and the EXCLUSIVE-OR function with the keystream is performed. It is then placed in the B register and the output from the switch is placed in the R register. The previous contents of the B and R registers are shifted along, byte by byte until all the bytes appear in the B register. This process constitutes one round. The next round starts by placing the contents of the B register in the A register but in reverse byte order. At least three rounds are required to produce good ciphertext.

One Way Function

A suitable one way function is shown in figure 21. It has a 256 x 8 bit look-up-table (LUT) in nine positions. This table contains truly random 'ones' and 'zeros'.

The 64 bit key and the 64 bit contents of register R are added modulo 256. The resulting 64 bit value is applied to 8 identical look-up tables. A different 1 bit output is taken from each table and these form an 8 bit value. This 8 bit value is applied to a modulo 256 accumulator. This causes each output byte to be influenced by the previous bytes generated during each round of the main algorithm.

The accumulator memory is cleared to zero at the start of each round. The output of the accumulator is applied to a ninth lookup table, identical to the others. Its output forms the key stream of figure 20.

Text Scrambling

The algorithm can also be used to scramble or descramble the user data by placing the switch in figure 20 in the appropriate position. Only one round is required. To perform either function, the input data is placed in register A and the result appears in register B.

21	Independent Data Services	Packets carry information unrelated to, and completely independent of, any accompanying service organised as magazines of pages. See figure 23.
21.1	Clock Run-In and Framing code	Bytes 1 to 3 as Section 9.
21.2	Designation Code	Byte 5, 4 bits data plus 4 bits Hamming protection. Data bits set to 1111 designate Independent Data Service Packet.
21.2.1	Transmission Multiplexing	Television signal data lines carrying these Packets may be included amongst the data lines of a teletext service or may be transmitted using otherwise unused lines. These data lines may always be added at any point in the transmission chain, provided that a new data channel is used (see also Section 21.3).
21.3	Data Channel Addressing	Byte 4, 4 bits data plus 4 bits Hamming protection provides 16 Data Channels. These are numbered 0 to 15 and correspond to bit values 0000 to 1111. The least significant bit is transmitted first. For the services defined in Section 21 four data channels are allocated: Data Channel Number — Address Bit Values in Transmission Order 8 — 0001 9 — 1001 10 — 0101 11 — 1101 Note that data channel 0, defined by the data bits being set to 0000 is used for the Broadcasting Service Data Packet, see Section 13.
21.4	Format Type (FT)	Byte 6, 4 bits data plus 4 bits Hamming protection. Format Type 'A'. Defined by: Bit 1...set to 0 Bit 2...set to 1 repeat packet facility applies, see section 21.4.3 Bit 2...set to 0 no repeat facility Bit 3...set to 1 explicit continuity indicator included Bit 3...set to 0 continuity indicator is implicit Bit 4...set to 1 Data Length Byte in Use Bit 4...set to 0 Data Length Byte not in use

21.4.1	Service Packet Interpretation and Address Length (IAL)	Byte 7, 4 bits data plus 4 bits Hamming protection. The first three bits define the number of immediately following Hamming coded bytes which are allocated to defining the service packet address. All three bits set to 0 indicate that there is no service packet address within the data line. Each incrément in binary value adds 4 bits to the address length up to a maximum of 24 bits. All three bits set to 1 reserved for future extensions. The fourth bit set to 0 defines data as independent of the contents of any other channel or address. The fourth bit set to 1 indicates that interpretation of the data may require the use of data in other channels or with other addresses as defined by the application.
21.4.2	Service Packet Addresses	When present bytes 8 to 13, see Section 21.4.1. NOTE When differentiated by the appropriate Address Length data in byte 7, the less significant bytes of an address may constitute another complete address in the same data channel. Thus, for example, the 24-bit address ABC123 can co-exist with the 20-bit address BC123 and the 8-bit address 23.
21.4.3	Service Packet Repeat Indicator (RI)	This byte follows the Service Packet Address and is only present when the Format Type bits are appropriately set, see Section 21.4. The first 4 bits are set to '0' when a new packet of that Service Data Channel is first transmitted and shall be incremented modulo-16 on subsequent repeats. The next three bits are reserved for future extensions. The last bit is set to '0' to indicate that no further repeats of the current packet should be expected. This last bit shall be set to '1' when a further repeat is to be expected.
21.4.4	Packet Continuity Indicator (CI)	This byte follows the Service Packet Address or the Service Packet Repeat Indicator, if present. It is only present when the Format Type bits are appropriately set, see Section 21.4. It represents an 8-bit number which is incremented modulo-256 with each new packet of the same address on the same data channel. It is not incremented on repeated transmissions of the same packet.

21.4.5	Data Length Byte (DL)	This byte follows the Service Packet Address or the Service Packet Repeat Indicator or Packet Continuity Indicator if they are present. It is only present when the Format Type bits are appropriately set, see Section 21.4. The two most significant bits are not defined. The remaining six bits define the number of 8-bit bytes of user data intended to be delivered to the user. The count is taken from the start of the User Data Byte Group and includes any dummy bytes, see Section 21.4.6. The DL byte is included when it is necessary to send an incompletely filled packet. Any remaining bytes of the User Data Group are not defined but are subject to the CRC, see Section 21.4.7. The six data bits defining the Data Byte Length may be set to '0', to keep a data service channel open when there is no data for delivery to the user.
21.4.6	User Data Group	The remaining data bytes in the data line, excepting the last two, constitute the data carried for users of the service bearing that Service Packet Address on that data channel. The number of bytes available depends upon the address length, whether the repeat facility is used, and whether the continuity indicator is implicit or explicit. Thus there are between 28 and 36 data bytes available for 625 line system applications and between 20 and 28 for 525 line system applications. Certain forms of coding may give rise to long strings of '0's or '1's. It is desirable to remove these from the transmitted data field to ensure reliable operation of all equipment that may process the signal. When within any user data group a sequence of eight consecutive bytes containing all '0's or 8 consecutive bytes containing all '1's occurs, taken together with its CI byte if present, a following dummy byte will be inserted. This dummy byte is included in the calculation of the CRC, (see Section 21.4.7) but is otherwise ignored by the decoder. NOTE Decoders must be designed to recognise these dummy bytes. However their inclusion may in the future no longer be necessary and it would be desirable to omit them to increase efficiency. It is therefore recommended that decoders should be capable of convenient modification or adjustment when this occurs.

21.4.7	Cyclic Redundancy Check Word	The last two bytes contain a Cyclic Redundancy Check on the User Data Group (see Section 21.4.6) and on any Continuity Indicator (CI) or Data Length (DL) byte. if present (see Section 21.4.4).
21.4.7.1	Check Word Generation	The data to be checked is considered as a polynomial in x with the highest degree term transmitted first and the term of degree zero last. This is divided, using modulo-2 arithmetic by the polynomial: $X^{16} + X^{9} + X^{7} + X^{4} + X^{0}$ The remainder from this process, with the highest term transmitted first, is the CRC. When an implicit continuity indicator is signalled by the third message bit of the FT byte, the transmitted CRC is modified such that the described generation process results in the register containing the 8-bit continuity indicator byte twice, with the least significant bit at the right-hand end.
21.4.7.2	Check Result	The register of figure 24 is set to 0s. The serial data followed by the CRC is then entered. The check is satisfied if the register again contains all 0s.

NOTE
TRANSMISSION SEQUENCE
For any Service Packet Address, the corresponding serial data stream is divided into User Data Groups. These must be transmitted in the correct sequence, which is monitored by the continuity indicator. Provided that the Repeat Indicator is used, each group may be repeated any number of times before the next is sent. There may or may not be an interval between consecutive data-lines with the same Service Packet Address.

Data lines carrying different Service Packet Addresses may be combined in any order to form a Data channel, provided that the sequence for each Service Packet Address is not disturbed.

Data-lines from different Data Channels may be combined in any order provided that the sequence within each contributing source is not disturbed.

CONDITIONAL ACCESS - INDEPENDENT DATA SERVICES
BLOCK MODE

22	Conditional Access	Data in the User Data Group (see Section 21.4.6) of a number of Independent Data Service Packets are linked to form Data Blocks. They may contain Messages concerning access that are not Encrypted, Encrypted Messages concerning access and User Data to be communicated.
22.1	Block Separator	Byte 1 of a data block. Blocks of data are separated by the transmission of the character 'hex 10' (DLE). If the character DLE occurs within the Data Block it shall be repeated to indicate that it is not a block separator.
22.2	Block Formats	Two alternative formats are defined. Format A is defined in Section 22.3 and Format B in Section 22.4.
22.3	Block Format A	'User Data' is the data stream originated by a sender and intended for delivery to a specified recipient or group of recipients. 'Messages' are groups of data concerned with the access to User Data and are for controlling the decoder or placing it in operation. A suitable encryption algorithm is shown in figure 20, see also Notes to Section 20.
22.3.1	Block Type	Byte 2 of a data block defines the block type. This byte is of the form 04/0x where x may have a value of 0, 1, 2, 3, 4, 5, 6 or 7. Block Type Code — Interpretation 04/00 — Block contains User-Data not Scrambled see figure 29(a) 04/01 — Block contains Key-Message not Encrypted, and the Encrypted Key-Message 04/02 — Service Numbers and Sequence Numbers, not encrypted and Scrambled User-Data. 04/03 — System-Key Message Block 04/04 — Shared-User Message Block 04/05 — Unique-User Message Block 04/06 — Service-Address Message Block for Independent Data Services 04/07 — Service-Address Message Block for Page Format Services

22.3.2	Primary Block Key Messages	Block Type Code 04/01. See figure 29(...)
22.3.2.1	Block Key Message Bit Allocation Data Not Encrypted	In Use System Key Label 8 bits followed by data defined in Section 22.3.2.2.
22.3.2.2	Block Key Message Bit Allocation Data Encrypted	This data is encrypted with the Current System Key (1) Service Modes 2 bits Bit 2 Bit 1 0 0 256 Services Non-Tiered 0 1 64 Services Tiered 1 0 256 Services with Credit Tokens 1 1 Not Assigned (2) Set to '0' 6 bits (3) Current System Key 56 bits (4) Service Identification Number 8 bits Service Mode 1 or 3: 8 bits define service numbers 0 to 255. Service Mode 2: 6 most significant bits of 8 bit group define service number 0 to 63. The two least significant bits define the service tier: Bit 2 Bit 1 0 0 Basic Tier 0 1 Basic + Premium Tier 1 0 Basic + Premium + Extra Tier 1 1 Not Assigned (5) Block Key 56 bits (6) Key Value Credit 8 bits fractional Token Units 8 bits whole part
22.3.2.3	Block Key Message Bit Allocation Data Not Encrypted	Scrambling Method 5 bits See figure 26(a) Set to '0' 3 bits

22.3.3	Secondary Block Messages and Scrambled User Data	Block Type Code 04/02. See figure 29(c)
22.3.3.1	Service and Sequence Numbers Not Encrypted Bit Allocation	Service Identification Number 8 Bits Sequence Number 8 bits The Sequence Number may be used as the cipher initial variable.
22.3.3.2	Scrambled User Data	The rest of this data block contains the Scrambled Data intended for receipt by the addressee(s).
22.3.4	System-Key Message Block	Block Type Code 04/03. See figure 29(d).
22.3.4.1	System-Key Message Block Bit Allocation Data Not Encrypted	(1) Encryption Method 8 bits (2) New System Key Label 8 bits (3) Current System Key Label 8 bits Followed by data defined in Section 22.3.4.2.
22.3.4.2	System-Key Message Block Bit Allocation Data Encrypted	This data is encrypted with the New System Key (1) New System Key 56 bits (2) Current System Key 56 bits
22.3.5	Shared-User Message Block	Block Type Code 04/04. See figure 29(e).
22.3.5.1	Shared-User Message Block Bit Allocation Data Not Encrypted	(1) Shared User Address 20 bits (2) Set to '0' 4 bits Followed by data defined in Section 22.3.5.2.
22.3.5.2	Shared-User Message Block Bit Allocation Data Encrypted	This data is encrypted with the Shared Distribution key, see Section 22.3.6.2. (1) New System Key 56 bits (2) User Enabling Bits 152 bits 0=disabled; 1=enabled

22.3.6	Unique-User Message Block	Block Type Code 04/05. See figure 29(f).
22.3.6.1	Unique-User Message Block Bit Allocation Data Not Encrypted	Unique User Address 32 bits Followed by data defined in Section 22.3.6.2.
22.3.6.2	Unique-User Message Block Bit Allocation Data Encrypted	This data is encrypted with the Unique Equipment Key (1) Service Mode (see Section 22.3.2.2) 2 bits (2) Service Reference Number 2 bits (3) Current or New Shared Address 20 bits (4) Unique Equipment Key 56 bits (5a) Service Modes 1 and 2 7 Service Numbers of 8 bits 56 bits or (5b) Service Mode 3 Total credit tokens purchased for 2 services: 1st Service Number 8 bits Credit Tokens Purchased 20 bits 2nd Service Number 8 bits Credit Tokens Purchased 20 bits (6) Current or New Shared Distribution Key 56 bits (7) Current or New User Enabling Bit Position 8 bits
22.3.7	Service Address Message Block Independent Data Service	Block Type Code 04/06. See figure 29(g)
22.3.7.1	Service Address Message Block Not Encrypted Bit Allocation	(1) Service Number 8 bits (2) Address Length (AL) 3 bits as Section 21.4.1. (3) Service Address up to 24 bits This group is repeated for each service number

22.3.8	Service Address Message Block Page Format Service	Block Type Code 04/07. See figure 29(h)
22.3.8.1	Service Address Message Block Magazine Number Not Encrypted Bit Allocation	Byte following Block Type Code. (1) Magazine Number 3 bits (2) Set to '0' 5 bits This byte is not repeated for each service number.
22.3.8.2	Service Address Message Block Not Encrypted Initial Page Number Bit Allocation	(1) Service Number 8 bits (2) Initial Page Number 8 bits This group is repeated for each service number.

22.4	Block Format B	'User Data' is the data stream originated by a sender and intended for delivery to a specified recipient or group of recipients, see figure 39. 'Messages' are groups of data concerned with the access to User Data and are for controlling the decoder or placing it in operation, see figure 39. A suitable encryption algorithm is shown in figure 40, see also the Notes to Section 22.
22.4.1	Block Type	Byte 2 of a data block defines the block type. This byte is of the form 5/X where X may have the hexadecimal value of 0, 7, 8, 9, A, B, C, D, E or F. Block Type Code — Interpretation 5/0 — Non-scrambled Channel and Terminator 5/7 — Common User-Data 5/8 — User-Data Key Message 5/9 — Key-Conversion Message 5/A — Shared System-Key Message 5/B — Group User-Data 5/C — Unique System-Key Message 5/D — Shared Equipment-Key Message 5/E — Over-Air-Credit Message 5/F — Unique User-Data Groups of bytes in Messages are transmitted with the least significant byte first. Groups of bits in Messages defining a Mask are transmitted with mask bit '0' first.
22.4.2	Non-Scrambled Channel	Bytes following Block Type Code 5/0 up to the next block separator (DLE) do not include scrambled or encrypted data. This block type is used to terminate a previous block, when there is no other data for inclusion.
22.4.3	Common User Data Block	Block Type Code 5/7, see figure 41(a).
22.4.3.1	Common User Data Block Bit Allocation Not Encrypted	In Use System Key Label — 1 byte Cipher Initial Variable — 1 byte
22.4.3.2	Common User Data Block	User Data - any number of bytes scrambled by cipher stream using encryption method 2 in Output Feedback Mode, see figure 26.

22.4.4	Group User Data Block	Block Type Code 5/B, see figure 41(b).
22.4.4.1	Group User-Data Block Bit Allocation Not Encrypted	Shared User Address 3 bytes Cipher Initial Variable 1 byte
22.4.4.2	Group User-Data Block User Data	User Data - any number of bytes scrambled by cipher stream using encryption method 2 in Output Feedback Mode, see figure 26.
22.4.5	Unique User-Data Block	Block Type Code 5/F, see figure 41(c).
22.4.5.1	Unique User-Data Block Bit Allocation Not Encrypted	Unique User Address 5 bytes Cipher Initial Variable 1 byte
22.4.5.2	Unique User-Data Block User Data Bit Allocation	User Data - any number of bytes scrambled by cipher stream using encryption method 2 in Output Feedback Mode, see figure 26.
22.4.6	User-Data Key Message Block	Block Type Code 5/8, see figure 41(d).
22.4.6.1	User-Data Key Message Block Bit Allocation Not Enciphered	Decoder Secure Module Address 1 byte In Use System Key Label 1 byte User Data Key Label 1 byte
22.4.6.2	User-Data Key Message Block Bit Allocation Data Encrypted	Data Encrypted with Current System Key using encryption method 2 in Differential Code Book Mode, see figure 26. Part Current System Key 5 least significant bytes Sub-service 1 byte Item Value fractional part of value 1 byte whole unit part of value 1 byte User Data Key 8 bytes

22.4.7	Key-Conversion Message Block	Block Type Code 5/9, see figure 41(e).
22.4.7.1	Key-Conversion Message Block Bit Allocation Not Encrypted	New System Key Label 1 byte Current System Key Label 1 byte
22.4.7.2	Key-Conversion Message Block Bit Allocation Data Encrypted	Data Encrypted with New System Key using encryption method 2 in Differential Code Book Mode, see figure 26. Current System Key 8 bytes
22.4.8	Shared System-Key Message Block	Block Type Code 5/A, see figure 41(f).
22.4.8.1	Shared System-Key Message Block Bit Allocation Not Encrypted	Shared User Address 3 bytes
22.4.8.2	Shared System-Key Message Block Bit Allocation Data Encrypted	Data Encrypted with Shared Equipment Key using encryption method 2 in Differential Code Book Mode, see figure 26. Part Shared Equipment Key 7 least significant bytes In Use System Key Label 1 byte User Enabling Mask 32 bytes In Use System Key 8 bytes
22.4.9	Unique System-Key Message Block	Block Type Code 5/C, see figure 41(g).
22.4.9.1	Unique System-Key Message Block Bit Allocation Not Encrypted	Unique User Address 5 bytes
22.4.9.2	Unique System-Key Message Block Bit Allocation Data Encrypted	Data encrypted with Unique Equipment Key using encryption method 2 in Differential Code Book Mode, see figure 26. Part Unique Equipment Key 7 least significant bytes Current System Key Label 1 byte Sub-service Mask 16 bytes Current System Key 8 bytes

22.4.10	Shared Equipment-Key Message Block	Block Type Code 5/D, see figure 41(h)
22.4.10.1	Shared Equipment-Key Message Block Bit Allocation Not Encrypted	Unique User Address 5 bytes
22.4.10.2	Shared Equipment-Key Message Block Bit Allocation Data Encrypted	Data encrypted with Unique Equipment Key using encryption method 2 in Differential Code Book Mode, see figure 26. Part Unique Equipment Key 4 least significant bytes Shared Address 3 bytes Enabling Bit Pointer 1 byte Sub-service Mask 16 bytes Shared Equipment Key 8 bytes
22.4.11	Over-air Credit Message Block	Block Type Code 5/E, see figure 41(j).
22.4.11.1	Over-air Credit Message Block Bit Allocation Not Encrypted	Unique User Address 5 bytes
22.4.11.2	Over-air Credit Message Block Bit Allocation Data Encrypted	Data encrypted with Unique Equipment Key using encryption method 2 in Differential Code Book Mode, see figure 26. Previous Total Credit 4 bytes Unique Equipment Key 8 bytes New Total Credit 4 bytes

NOTES TO SECTION 22.4

SIMPLE BLOCK ENCIPHERMENT ALGORITHM

Encryption Method 2 Figure 26

Current Standardization activity on data encipherment is based on the use of a 64-bit cipher in one of four modes. The key word length is at least 48 bits.

An encipherment algorithm is proposed which is relatively simple to implement in software or hardware, including VSLI, with adequate security for commercial broadcasting applications. It uses 64-bit blocks and a 48-bit key, extendable to 64-bits.

The operation uses a device, called a permuter, which under the command of a 2-bit control input, converts an 8-bit input word to an 8-bit output word. The conversion is by means of one of four stored permutations of the 256 input states to 256 output states. Because these are permutations, not random 'look-up tables', the operation is reversible, each output state corresponding to one and only one input state for a given control word. Thus for every permuter there is a complementary permuter which acts in the reverse direction.

A convenient embodiment of the permuter is a 1024 by 8-bit ROM. It has a 10 bit input, 2 bits being assigned to the control function and the remainder are the 8-bit input word. 24 permuters are required for full-speed operation. It is recommended that for commercial broadcasting applications, all the permuters are identical but the method describes the general case where they can all be different.

In figure 40 the permuters are shown as 8-by-8 squares with 8 inputs on the left-hand edge and 8 outputs on the right-hand edge. The are in banks of 8 so that they handle 64 bits at once. The ordered 64-bit input is applied to the 64 input points using a fixed but irregular (e.g.random permutation of the 64 items) distribution. The output of the first bank of permuters (a-h) forms the input to the second bank (j-r). It is desirable that each permuter in the second bank has one input from each of the permuters in the first bank. The same consideration applies when coupling the second bank to the third bank of permuters (s-z). This is shown in figure 40 by simple transposition. Although a more random fixed permutation would be of advantage, it is not considered necessary for this application. The output 64 bits are assembled using another fixed but irregular distribution. The 48-bit key is applied to the 24 permuters such that each receives 2 unique control bits in a fixed and not necessarily irregular way.

The principles can be readily extended to a 64 bit key by adding another bank of permuters, using the same pattern.

By reading figure 40 from right to left, with complementary permuters, but using the original control, bits from the key word, the reverse process takes place to decipher the 64-bit block. The same key is used as that for the original encipherment.

23.1.4	Musical Controls	The quality of musical tones and the relationship of the musical parts is defined by the control codes of figure 63. These are transmitted in the first byte of a 2-byte pair. Where the first byte defines such a control code the second byte of the 2-byte pair defines the associated parameter as a decimal digit value 0 to 95 according to figure 64.
23.1.4.1	START OF MUSIC CODES SMCn 0/0	A sequence of musical codes forming a musical entity shall commence with this code. The parameter defines the reference time interval t of the T2 Tone set, in multiples of 0.01s see figure 62.
23.1.4.2	END OF MUSICAL CODES EMC 0/4	Denotes the end of a sequnce of musical codes forming a musical entity. This code is transmitted twice to form a 2-byte group, as it has no associated parameter. It may also be used to complete a packet.
23.1.4.3	START OF MELODIC PART SMPn 0/1	Parts are defined consecutively, in any order. This code defines the start of a melodic sequence having defined pitches. The parameter defines an instrumental timbre according to figure 65. This 2-byte pair must be preceded by a START MUSICAL CODE (SMC) or END OF PART (EOP) group. When such a preceding code is not received the codes up to the next END OF PART code shall be ignored.
23.1.4.4	START OF RHYTHMIC PART SRPn 0/2	Parts are defined consecutively, in any order. This code defines the start of a rhythmic sequence having indefinite pitch. The parameter defines the intrumental timbre according to figure 66. This 2-byte pair must be followed by 2-byte pairs defining the pitch as 'indefinite' according to table 61. Where other pitches are defined, codes up to the next END OF PART code shall be ignored. This 2-byte pair must be preceded by a START MUSICAL CODE (SMC) or END OF PART (EOP) group. When such a preceding code is not received the codes up to the next END OF PART code shall be ignored.
23.1.4.5	END OF PART EOP 0/5	Defines end of a melodic or rhythmic part, see Sections 23.1.4.3.and 23.1.4.4. This code is transmitted twice as it has no associated parameter.
23.1.4.6	LABEL of LBLn 0/8	This control together with the following parameter, labels a part as the destination a JUMP or a BRANCH control function.
23.1.4.7	JUMP JMPn 0/9	This control causes a jump to the part labled with the parameter LBLn.

23.1.4.8	REPEAT NUMBER of TIMES RNTn 0/10	This control together with the associated parameter defines the number of times a sequence is to be repeated, starting from the REPEAT START LABEL. In the absence of a following REPEAT START LABEL this control is to be ignored.
23.1.4.9	REPEAT START LABEL RSLn 1/10	This control together with the associated parameter defines the start point of a repeating sequence. The parameter value n corresponds to a labled point in the musical part.
23.1.4.10	BRANCH AFTER PASSING BAPn 0/11	This control together with the associated parameter defines the number of times a musical part shall be repeated before immediately jumping to the labled destination.
23.1.4.11	BRANCH TO LABEL BTLn 1/11	This control together with the associated parameter defines the destination of a branch. It must be preceded by the BRANCH AFTER PASSING control, in the absence of which it shall be ignored.
23.1.4.12	SOUND LEVEL SLVn 1/0	This control together with the associated parameter defines the sound level in steps of 1dB. Decoding equipment that can only generate steps greater than 1dB shall interpret intermediate steps as having the next lower possible value.
23.1.4.13	CHANGE OF TIMBRE CTMn 0/12	This control causes a change to the timbre defined by the associated parameter according to figure 65.
23.1.4.14	DURATION MULTIPLIER LRTn 1/8	This control causes the duration of the immediately following musial tone or rest to be multiplied by the decimal value defined by the associated parameter.

24	Service Identification Data	In MAC-packet address '0'.
24.1	List of Services	Parameter LISTX coded '18 in MAC-packet address '0'.
24.1.1	LISTX Item	'TELETEXT' coded '03.
24.2	Digital Component Information	Parameter DCINF in MAC-packet '0' coded: 'B0 first level protection general teletext service 'B2 second level protection general teletext service 'B8 first level protection subtitling service 'BA second level protection subtitling Note - The 'general teletext service' may include subtitling and non-text data.
24.2.1	Access Coordinates	2 bytes associated with DCINF parameter; bit numbers: 1 to 10 MAC-packet address 11 and 12 1 0 Data only in subframe TDMCID 01 0 1 Data only in subframe TDMCID 02 1 1 Data in both subframes, service component in D2MAC subframe only 0 0 Data in both subframes, service component not in D2MAC subframe only 13 to 16 Reserved for future standardization
25	Teletext Data Blocks	Carried by MAC-packets addressed as in section 24 commencing with a Packet Header and a PT byte, see Figures 69 and 70
25.1	Error Protection	First Level Protection two Teletext Data Blocks Second level Protection one Teletext Data Block and 30 Golay codes and parity bits, see Figures 69 and 70.

25.1.1	Second Level Protection	Using Golay coding, each successive 12 bit data word from the teletext data block has appended 11 error check bits and a single parity bit. The generator polynomial for the Golay code is given by: $G(x) = x^{11} + x^{10} + x^6 + x^5 + x^4 + x^2 + 1$
25.1.2	MAC-Packet Header	10 bits packet address 2 bits continuity index, least significant bit first 11 bits protection suffix
25.1.2.1	Packet Address	10 bits transmitted least significant bit first Address '0' is allocated to Service Identification, see Section 24. Address '1023' is allocated to dummy packets for packet filling applications
25.1.2.2	Continuity Index	2 bits transmitted least significant bit first, incremented for each MAC-packet of the same service.
25.1.2.3	Protection Suffix	11 bits Golay code (23,12). The generator polynomial is given by: $G(x) = x^{11} + x^{10} + x^6 + x^5 + x^4 + x^2 + 1$
25.1.3	Packet Type (PT) Byte	Defines access mode at MAC-packet level: '00 unscrambled 'C7 scrambled free access 'F8 scrambled controlled access '3F reserved Note - Independent scrambling and access control may be provided at the teletext packet level.

25.2	Teletext Data Block	(a) 1 byte Control Data 8/4 Hamming protected transmitted least significant bit first bit number 2 4 6 8 1 1 1 1 transparent transmission of teletext packets 0 1 1 1 last or only transmission of a teletext packet The interpretation of other bit combinations is reserved. (b) 2+40 bytes teletext data as in Section 10 onwards, i.e. teletext packets less the clock run-in and framing code. (c) 2 bytes cyclic redundancy check on the 40 bytes of data in (b) above. The bits comprising the 40 bytes in transmission order m[319] to m[0] are followed by the check bits r[15] to r[0] in the same order. The check bits are such the the polynomial: $m[319]x^{335} + m[318]x^{334} + ..+ m[0]^{16} + r[15]^{15} + ..+ r[1]x + r[0]$ is a modulo 2 multiple of the polynomial: $x^{16} + x^{12} + x^5 + 1$ see Figure 71.

TRANSMISSION CODING - NICAM 728 SYSTEM

26	NICAM 728 System Data	The NICAM 728 system is primarily intended for digital sound transmission. This Section defines the use of this channel for carrying data as specified in sections 10 onwards.
26.1	Data Frame	8-bit Frame Alignment Word 5 bits Control Data 3 bits Digital Component Information 8 bits Hamming Protection 88 bytes Data, see Section 27.
26.1.1	Frame Alignment Word	01001110, transmitted in that order
26.1.2	Control Data	1 bit Frame Flag 3 bits Application Control 1 bit Reserve Sound Flag
26.1.2.1	Frame Flag Bit	Set to '1' for 8 successive frames and to '0' for the next 8 successive frames. A sequence of frames starts with the first frame having the frame flag bit set to '1'.
26.1.2.2	Application Control	bit number 1 2 3 1 0 0 Mono sound and data in alternate frames 1 1 0 Data in all frames The interpretation of other bit combinations is reserved.

26.1.2.3	Reserved Sound Flag	Set to '1' alternate frame mono sound is duplicated by FM sound signal. Set to '0' when data only is transmitted. Note - Other settings are required for stereo sound applications.
26.1.3	Digital Component Information	bit number 1 2 3 0 0 0 first level protection general teletext service 1 0 0 second level protection general teletext service 0 1 0 first level protection subtitling service 1 1 0 second level protection subtitling service The interpretation of other bit combinations is reserved. Note - The 'general teletext service' may include subtitling and non-text data.
26.1.4	Control Data Protection	8 bits Hamming protection for 8 bits Control Data and Digital Component Information, see Sections 26.1.2 and 26.1.3.
26.2	Energy Dispersal Scrambling	The Frame Alignment Word is not scrambled. The scrambling is synchronous with the data frames using the Frame Alignment Word. The bit immediately following the Frame Alignment Word is the first scrambled bit and is added modulo-2 to the first bit of the pseudo random sequence. The bit immediately preceeding the Frame Alignment Word is the last scrambled bit. The Pseudo Random Sequence Generator Polynomial is: $x^9 + x^4 + 1$ The Initialisation Word is 1 1 1 1 1 1 1 1 1

27	Teletext Data Blocks	Carried as in section 26
27.1	Error Protection	First Level Protection: two Teletext Data Blocks Second level Protection: one Teletext Data Block and a Protection Block of 30 Golay codes and parity bits, see Figures 72 and 73.
27.1.1	Second Level Protection	Using Golay coding, each successive 12 bit data word from the teletext data block has appended 11 error check bits. The final 12 bit word is completed by assuming the presence of 8 bits set to '0'. The Protection block is complete by 30 bits set to '0'. The generator polynomial for the Golay code is given by: $G(x) = x^{11} + x^{10} + x^6 + x^5 + x^4 + x^2 + 1$
27.2	Teletext Data Block	(a) 2+40 bytes teletext data as in Section 10 onwards, i.e. teletext packets less the clock run-in and framing code. (c) 2 bytes cyclic redundancy check on the 40 bytes of data in (b) above. The bits comprising the 40 bytes in transmission order m[319] to m[0] are followed by the check bits r[15] to r[0] in the same order. The check bits are such the the polynomial: $m[319]x^{335} + m[318]x^{334} + ..+ m[0]^{16} + r[15]^{15} + ..+ r[1]x + r[0]$ is a modulo-2 multiple of the polynomial: $x^{16} + x^{12} + x^5 + 1$ see Figure 74.

TELEVISION PROGRAMME DELIVERY SERVICE

28.	Television Programme Delivery Service	Uses packets with Y=26 to carry codes for programming ancilliary equipment such as video recorders in order that they respond to the control data as defined in Section 13. These codes can refer to items identifiable by means of a cursor, in the displayable data of the page.	
28.1	Clock Run-In, Framing Code and Packet Address	Bytes 1 to 3 as Section 9.	
28.2	Designation Codes	Byte 6, 4 bits data plus 4 bits Hamming protection. Codes 0000 to 1111 are sequence labels for up to 16 packets with Y=26 associated with a given page. The sequence is part of that specified in Section 14.6.2. The data groups defined in this Section follow those of Section 14. The terminator and CRC check digit complete the sequence as in Sections 14.6.9 and 14.6.11. The data specified in this Section shall be transmitted as a continuous sequence of packets with Y=26 and not interleaved with packets with Y=26 providing other functions or with other packets.	Tabulation bit T is the most significant bit of the Designation Code, then follows byte 6 with 4 bits data plus 4 bits Hamming protection. Codes 00000 to 11111 are sequence labels for up to 32 packets with Y=26 associated with a given page. The sequence is part of that specified in Section 14.6.2. The data groups defined in this Section follow those of Section 14. The terminator completes the sequence as in Section 14.6.9. The data specified in this Section shall be transmitted as a continuous sequence of packets with Y=26 and not interleaved with packets with Y=26 providing other functions or with other packets.
28.3	Data Groups	Bytes 7 to 45, as 13 groups of 3 bytes each. 18 bits data and 6 bits Hamming protection	Bytes 7 to 36, as 10 groups of 3 bytes each. Byte 37 is reserved. 18 bits data and 6 bits Hamming protection

28.4	Programme Delivery Service Format A	Facilitates response to data defined in Section 13.3.4. See figure 75 and Appendix 8.
28.4.1	Data Group Bit Allocation	6 bits data word A, transmitted least significant bit first 5 bits mode description 7 bits data word B, transmitted least significant bit first 6 bits Hamming protection
28.4.2	Source Definition Data Group	Data Word A - Country of Origin, see Section 13.3.5.4 and figure 79 for code table. 4 least significant bits specify country of origin 2 most signficant bits are set to 1. When set to '0' the complete Source Definition group and subsequent other data groups up to the next Source Definition group shall be ignored. Mode Description bits set to 01000 invoke the Source Definition function. See figure 11. Data Word B - Programme Source, see Section 13.3.5.5 and Appendix 4. data bits 1 to 6 correspond respectively to data bits 36 to 31 of Section 13.3.5.5. data bit 7 set to '0' first set of 64 programme sources, set to '1' second set of 64 programme sources. In a given page, the Source and Date Definition data groups apply to subsequent data groups defining time. Either or both of these data groups shall be retransmitted, when the source and/or date within a given page is to be redefined. See figure 76.

28.4.3	Date Definition Data Group	Data Word A - Month, 2 most significant bits are set to '1'. 4 least significant bits correspond to the equivalent bits in Section 13.3.5.3. Decimal values 49 to 60 define months respectively as January to December. The complete Date Definition Data group and subsequent other data groups up to the next Source or Date Definition group shall be ignored if decimal values 48 and 61 to 63 are transmitted or either of the 2 most significant bits are set to '0'. Mode Description bits set to 01001 invoke the Date Definition function. See figure 11. Data Word B - Data bits 1 to 4 specify the day 'units' in BCD form, bit 1 is the least significant bit. Data bits 5 and 6 specify the day 'tens' in BCD form, bit 5 is the least significant bit. The complete Date Definition group shall be ignored if values of these bits corresponding to decimal 4 are transmited. Data bit 7 set to '0'. See figure 76. The complete Date Definition group and subsequent other data groups up to the next Source or Date Definition group shall be ignored if the following bit values are transmitted: (a) data bits 1 to 6 corresponding to decimal value 00 (b) data bits 1-4 corresponding to decimal values 13 to 15 (c) data bits 5 and 6 corresponding to decimal value 4 (d) data bit 7 set to 1.

28.4.4	Local Time Offset	When within a given page, all hours and minutes defined in Section 28.4.5 are in Co-ordinated Universal Time (UTC) this data group need not be transmitted. When all items within a given page have the same Local Time Offset it need be transmitted once, immediately following the Date Definition group. When a given page includes items with different Local Time Offsets this group is transmitted before each such corresponding Hours and Minutes definition group.
28.4.4.1	Local Time Offset and Cursor Row Definition Group	Data Word A - specifies the row address of the selected cursor position. Decimal values 41 to 63 specify rows 1 to 23 and decimal value 40 specifies row 24. The cursor has no function when located in the header row 0. Mode Description bits set to 01100 invoke the Local Time Offset definition function. See figure 11. Data Word B - Data bits 1 to 7 specify the Local Time Offset in binary coded quarter hour units. Bit 1 is the least significant bit and defines 2^{-2} hour offset continuing to bit 6 that defines the 2^{3} hour offset. Bit 7 defines the sign of the offset, set to '1' being negative i.e. West of Greenwich.
28.4.5	Programme Timing Data	There shall be a sequence of pairs of data groups, specifing starting time hours and starting time minutes for programmes from a common source that run without a break. The finishing time hours and finishing time minutes shall be included when there is a break in the continuity of the programmes listed and following the final item listed on the page. See figure 76.

28.4.5.1	Starting Time Hours and Cursor Row Definition Group	Data Word A - specifies the row add. ss of the selected cursor position. Decimal values 41 to 63 specify rows 1 to 23 and decimal value 40 specifies row 24. The cursor has no function when located in the header row 0. Mode Description bits set to 01010 invoke the Starting Time Hours definition function. See figure 11. Data Word B - Data bits 1 to 4 specify the starting time hours 'units' in BCD form, bit 1 is the least significant bit. Data bits 5 and 6 specify the starting time hours 'tens' in BCD form, bit 5 is the least significant bit. Data bit 7, set to '0' programme item is for free access. Set to '1' programme is for Controlled Access. The complete Starting Time Hours Definition group, the associated Starting Time Minutes Definition group and the Finishing Time Definition groups if present shall be ignored if the following bit values are transmitted: (a) a value of 3 for the hours units digit is exceeded when the hours tens digit has a value of 2 (b) a value of the hours units exceding decimal 9 (c) a value for the hours tens exceeding 2.
28.4.5.2	Starting and Finishing Time Minutes and Cursor Position in Row	Data Word A - specifies the character-space within a row occupied by the cursor. Decimal values 0 to 39 specify character-spaces 1 to 40. Mode Description bits set to 00110 invoke the Starting and Finishing Time Minutes definition function. See figure 12. Data Word B - Data bits 1 to 4 specify the minutes units in BCD form, with bit 1 the least significant bit. Data bits 5 to 7 specify the minutes tens in BCD form, with bit 5 the least significant bit. The complete Starting Time Hours Definition group, the associated Starting Time Minutes Definition group and the Finishing Time Definition groups if present shall be ignored if a decimal value of the minutes units exceeding 9 or minutes tens exceeding 5, is transmitted. They shall also be ignored if the starting and finishing cursor row position do not correspond.

28.4.5.3	Finishing Time Hours and Cursor Row Definition Group	Data Word A - specifies the row address of the selected cursor position. Decimal values 41 to 63 specify rows 1 to 23 and decimal value 40 specifies row 24. The cursor has no function when located in the header row 0. Mode Description bits set to 01011 invoke the Finishing Time Hours definition function. See figure 11. Data Word B - Data bits 1 to 4 specify the finishing time hours 'units' in BCD form, bit 1 is the least significant bit. Data bits 5 and 6 specify the finishing time hours 'tens' in BCD form, bit 5 is the least significant bit. Data bit 7, set to '0' programme item is for free access. Set to '1' programme is for Controlled Access. The complete Starting Time Hours Definition group, the associated Starting Time Minutes Definition group and the Finishing Time Definition groups if present shall be ignored if the following bit values are transmitted: (a) a value of 3 for the hours units digit is exceeded when the hours tens digit has a value of 2 (b) a value of the hours units exceding decimal 9 (c) a value for the hours tens exceeding 2. They shall also be ingored if the cursor row position or access control bit in the respective starting and finishing time groups do not correspond.
28.4.6	Programme Type Definition Data	Follows the Programme Timing Data. Data Word A - set to 110000 defines that the corresponding programme is one of a series. Other Row Address Group values are reserved. Mode Description bits set to 01101 invoke the Programme Type definition function. See figure 11. Data bits 1 to 7 form a unique code for each programme in the series. This data only applies when the most significant bit of the Programme Type/Series code in the corresponding data group in packet 8/30 format 2 is set to '1'. If this bit is set to '0' this group shall be ignored.

PAGE ASSOCIATED ANCILLARY LABEL DATA

29.	Page Associated Ancillary Label Data	Uses packets with Y=25 to carry a number of LABELS relating to the data in the associated page.
29.1	Clock Run-in, Framing Code and Packet Address	Bytes 1 to 3 as Section 9.
29.2	Label Separators	Any Control Character from position 0/0 to 0/7 from figure 5. Following the standard protocol for packets with Y=1 to Y=24, Control Character 0/7 (alpha numeric white) is the default starting condition for packets with Y=25.
29.3	Label Sequence Terminator	Any Control Character from position 1/0 to 1/7 from figure 5. The interpretation of data in a given packet with Y=25, following a terminating control character is reserved.
29.4	Label Character Coding	The alpha numeric characters used in the label are those of the default or designated G0 character set including the default or specified option. The display colour defined by the separating control character applies to the display of the next label carried by the packet. Control Characters from figure 5, 0/8 to 0/15 and 1/8 to 1/15 may form part of a label.

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APPENDIX 1

RECOMMENDED ORDER OF TRANSMISSION FOR PACKETS WITH Y=26, Y=27 AND Y=28

To permit most efficient operation of the decoder it is recommended that following the transmission of a page header packet (Y=0), packets with Y=27, Y=28 and Y=26 are transmitted, in that order.

If a further header packet (Y=0) is transmitted, following the transmission of packets with Y=27, Y=28 and Y=26, then those packets must be re-transmitted.

APPENDIX 2

DECODER MEMORY

ALthough this specification does not explicitly introduce any limitations based on the expected size or speed of the decoder memory, certain decoders may have limitations in these respects as follows:

1 The number of attributes applicable to any one display row may be limited to 40.
2 The DRCS memory may be limited to 16k bits.
3 Up to 20ms may be required to erase the decoder memory after the receipt of a page header packet (Y=0). Thus it may be necessary for this period to elapse, after transmission of a page header packet before more data relating to that page is transmitted.

APPENDIX 3

HAMMING PROTECTED DATA

Certain data bytes are protected by Hamming Codes, two forms are used:

1 Bytes with four data bits and four protection bits.
In this form bits b1, b3, b5 and b7 are the protection bits
bits b2, b4, b6 and b8 carry the data
The Parity Checks Pn are:
P1 b8, b6, b2, b1
P2 b8, b4, b3, b2
P3 b6, b5 b4, b2
P4 bits 1 to 8 inclusive

2 Groups of three bytes with 18 data bits and 6 protection bits.
In this form bits b1, b2, b4, b8, b16 and b24 are the protection bits
bits b3, b5, b6, b7, b9, b10, b11, b12, b13, b14, b15, b17, b18, b19, b20, b21, b22, and b23 carry the data.
The Parity Checks Pn are:
P1 all odd numbered bits 1 to 23 inclusive
P2 b2, b3, b6, b7, b10, b11, b14, b15. b18, b19, b22, b23
P3 b4, b5, b6, b7, b12, b13, b14, b15, b20, b21, b22, b23
P4 bits numbered b8 to b15 inclusive
P5 bits numbered b16 to b23 inclusive
P6 bits numbered b1 to b24 inclusive

Examples of the bit sequences are shown in figure 1 and 2.

APPENDIX 4

BROADCAST SERVICE DATA - FORMAT 2

Concise Application Information

1. This form of packet 8/30 carries Video Programme System (VPS) data. The 48 bits comprising the data words in bytes 14 to 25 carry the VPS information. The programme is labelled by its scheduled date and time of expected transmission plus a country and network source code.

A label will remain constant for the duration of the corresponding programme item.

A programme item with a start scheduled after midnight is labelled with the strictly appropriate date. The scheduled time and date of a programme item are independent of the actual time and date of transmission.

When a programme item is to be transmitted earlier than the scheduled time, this shall take place within the scheduled day.

When a programme item is to be transmitted later than the scheduled time, the label is valid up to 04.00 hours on the following day.

Transmission of a programme item outside the above limits requires a new label to be defined.

2. The scheduled time of transmission may be expressed either in Co-ordinated Universal Time (UTC) or local time. The differences are defined in the Local Time Offset data including in the transmission of the packet.

3. Country Codes
This code is compatible with that proposed by the EBU for sound radio broadcasting and the code table is that of figure 79.

4. Network Codes
64 Network codes can be provided for each nationality with capability of extensior

5. Special Interpretation of Date and Time Codes
The date and time values beyond those required are given special meanings:

Day 0, Month 15, Hour 31, Minute 63
Data packet present but current programme is not labelled.

Day 0, Month 15, Hour 30, Minute 63
Transmission is not labelled and is not appropriate for recording, e.g. test transmission.

Day 0, Month 15, Hour 29, Minute 63
Interruption code, indicates that a programme interruption occurs and a recorder should hold a standby condition. It is to be noted that other programme item labels can be "nested" during an interruption.

APPENDIX 5

USER FRIENDLY PAGE ACCESS (FLOF)

A Code of Practice

A. INTRODUCTION

The object of this code of practice is to facilitate the addition of new service features, the design of receivers to exploit them and the introduction of the concepts to the market.

The intention is to provide ease of page selection, comprehensive use of the data base and a reduction in page acquisition time.

This code of practice is compatible with the WORLD SYSTEM TELETEXT SPECIFICATION but is not a part of that specification. It includes information applicable to broadcasters and receiver manufacturers.

B. OBJECTIVES

1. Simple User Control
2. Easier Selection of Information
3. Reduced Page Access Time
4. Compatibility with Existing Products in the Field
5. Compatibility with Existing Data Base Structures
6. Minimum Transmission Overheads
7. Moderate Editorial Overheads
8. Optimum Cost Effectiveness
9. Flexibility in Use
10. Unambiguous Operation
11. Compatibility with Decoders Having Storage Facilities for Any Number of Pages

C. TRANSMITTED PACKETS

In addition to the packets with Y=0 to Y=23, used for level one display, the service features included in this code of practice require the following extension packets:

Packets with Y=24 Page Data Extension Packet
In this application, this packet contains user 'prompt' information for display, provided by the editor. It associates a given key on the user's control unit with a linked page address included in packets with Y=27, see Section 12.2.

Packets with Y=27 Designation Code 0000 Page Service Data Packet
This packet contains the addresses of linked pages. link control information, display row 24 flag and error detection data, see Section 12.2.

Packet 8/30 (625 line) or 4/T/30 (525 line) Television Service Data Packet
Format 1 of this packet applies and contains the address of the 'Initial Teletext Page', 'Status Message', 'Time Offset from Universal Co-ordinated Time','Universal Co-ordinated Time', 'Modified Julian Date' and 'Television Programme Group Label'. When a given category of the above data is not included, fall-back codes will be included.

D. EXTENSION PACKET APPLICATION

D.1 Packet 8/30 or 4/T/30

D.1.1 The data defined in Sections 13.1 to 13.2.8 shall be transmitted.

D.1.2 Decoders intended for use with this code of practice shall process the designaton code (Section 13.1.2), recognising multiplexed or non multiplexed functions.

D.1.3 Decoders intended for use with this code of practice shall acquire the initial teletext page on switch-on or on changing channel, see Section 13.2.2.

D.1.4 Decoders intended for use with this code of practice may optionally process these data items:

-Network Identification (Section 13.2.3)
-Time Offset Code (Section 13.2.4)
-Modified Julian Date (Section 13.2.5)
-Co-ordinated Universal Time (Section 13.2.6)

D.1.5 Television Programme Label data (Section 13.2.7)
Decoders intended for use with this code of practice are not required to process this data item.

D.1.6 Status Display (Section 13.2.8)
Decoders intended for use with this code of practice may display the status message on switch-on and on changing channel. It is not intended to be presented in the teletext mode but is inserted in a box in the normal television picture display. Start Box and End Box control characters are not transmitted. The box must therefore be generated by the decoder. The display of the message shall be terminated after a suitable period. User controls may be provided to reactivate the display for a further period and to deactive the status display facility.

D.2 Packets with Y=27
Automatic Page Acquisition
A decoder intended for use with this code of practice shall process the linked page addresses (Section 12.2) to acquire pages automatically. The maximum number of pages stored is limited by the decoder memory capacity.

D.2.1 Coloured Keys - Prompt Mode
A decoder intended for use with this code of practice will provide four keys on the user s control unit, associated with the first four linked page addresses, in transmission order. These keys shall be respectively coloured red, green, yellow and cyan and relate to the associated displayable prompts that may be transmitted in a packet with Y=24.

D.2.2 Link Address Number 4
The fifth link address is not used in the functions defined above but may be used for additional Automatic Page Acquisition.

D.2.3 Link Address Number 5
A decoder intended for use with this code of practice will provide an INDEX KEY on the user's control unit. The sixth link address is associated with this key and the linked page shall carry suitable introductory material to assist the user. The use of the Index Key is not associated with a prompt transmitted in a packet with Y=24.

D.2.4 Display Row 24 Flag (Section 12.2.3.2)
Data bit 4 set to 1:
Packet with Y=24, if present, is to be displayed at the bottom of the associated page. Such a packet 24 may include the prompts as defined above.

Data bit 4 set to 0:
Packet with Y=24 is not to be displayed but may be present for other applications.

(The functions of data bits 1, 2 and 3 of the Link Control Data are as defined in the World System Teletext Specification (Section 12.2.3.1) and are not included in this code of practice.)

Decoders compatible with this code of practice shall process the Display Row 24 Flag bit 4 as described above.

D.2.5 Basic Page Check Word (Section 12.3)
Decoders intended for use with this code of practice may optionally process this check word.

D.3 Packets with Y=24
This packet is used in this code of practice to assist the user in page selection. The relationship between the displayed prompts and the users control keys should be clear.

Up to four prompts can be included in this packet, respectively distinguished by the inclusion of the colours red, green, yellow and cyan. The display should be such that a prompt can be distinguished by position as well as by colour.

The number of characters used in the prompts is only limited by the availability of 40 character codes in packets with Y=24.

The relationship between prompts transmitted in a packet with Y=24 and the link addresses in packets with Y=27 is as defined in Section D.2.1 and D.2.4.

E. SERVICE COMBINATIONS
The following fall-back conditions are defined:

E.1 No Packet 8/30 or 4/T/30
Multiplexed operation is assumed, with an initial page address 100, page sub-code being interpreted as 'dont care'. No status message is to be displayed.

E.2 No Packet with Y=27 and No Packet with Y=24
The index key will cause the initial page to be displayed; the coloured keys will be disabled.

E.3 Packet with Y=27 but No Packet with Y=24
At least an index link in the appropriate link number shall be provided.

E.4 A Packet with Y=24 included. other than for prompts in conformity with this code of practice. A packet with Y=24 may be included in any sequence of data. It shall only be displayed when the Display Row 24 Flag Bit is set to 1. see Section D.2.5.

F. CONFORMANCE

F.1 To conform with this code of practice the transmission shall include:
a packet 8/30 or 4/T/30 including the data specified in Section 13.2;

and

a packet with Y=27 including the data specified in Section 12.2;

and

a packet with Y=24 including data as specified in D.3.

Note: The inclusion of prompts in a packet with Y=24 of a given page is under editorial control since some material may not be suitable, e.g. due to rapidly changing content.

F.2 To conform with this code of practice a decoder shall:
in addition to packets with Y=0 to Y=23, at least acquire packets with Y=24, Y=27 and 8/30 or 4/T/30;

and

at least process the data in packet 8/30 or 4/T/30 as specified in Section D.1.2 and D.1.3;

and

at least process the data in packets with Y=27 as specified in Sections D.2 but excepting Sections D.2.2 and D.2.5.

and

at least display the data in the packet Y=24 as specified in Section D.3.

APPENDIX 6

RECOMMENDED CODE OF PRACTICE FOR USE OF PAGE

AND SUB-CODE ADDRESSES

There is a need for page headers to be available without any following data for time filling and page terminating applications. There is also a need for a page address to be available for internal use in decoders that will not occur in transmission. The following rules are recommended.

1. Any page address up to and including hexadecimal FE with a sub-code up to and including 3F7E, can be used for a page carrying data and can be specified as a linked page.

2. Page address number FF in any magazine, with any sub-code in the range 0000 to 3F7E may be used for time filling and as a page terminator.

3. Page header packets with the page address FF, sub-code 3F7F, will not be transmitted. This address will occur as a nul link in packets with Y=27 and 8/30.

APPENDIX 7

PAGE HEADER PACKET CONTROL BITS C4 ERASE PAGE AND C8 UPDATE INDICATOR

The use of these control bits is subject to editorial judgement. The following is the expected effect.

1. When a page is selected for immediate display that complete page is placed in memory.

2. Subsequent transmissions of the page will overwrite the initially stored page, any packets not overwritten remaining in memory for display.

3. Where a page is stored for subsequent rather than immediate display, as in decoders with storage for a number of pages, the overwriting may only occur when the page is displayed.

4. The update bit C8 is used by the editor specifically to indicate that an update has occurred. The expected effect in a decoder is, that where a page display has been cancelled by an appropriate user key ("cancel page", "picture" etc.) the setting of the update bit will cause a prompt, which may involve the automatic redisplay of the page. An application where this is standard practice is for news flashes. The unnecessary or inappropriate setting of the update bit can cause annoying redisplay of a page or news flash that a user wishes to cancel. The setting of the update bit is thus an editorial decision.

5. When the erase bit C4 is set, that page is expected to be erased completely and a new page written into memory.

6. The effect of both of these bits applies to packets 1 to 28 inclusively.

G ADDITIONAL DECODER FEATURES

Certain decoder features have been identified that do not require the transmission of additional data and do not need to be taken into account in the editorial processes. They do not form part of this code of practice but are included for for the guidance of equipment designers.

G.1 Decoder Display When there is No Transmitted Packet with Y=24

When the link addresses in a packet with Y=27 are not associated with prompts and no packet with Y=24 is transmitted. the decoder may generate a display. It is recommended that this may include the magazine and page numbers of the first four link addresses (numbers 0 to 3) in a packet with Y=27. Any page sub-code should not be displayed.

To utilise this facility, the link address number 0. displayed in red and relating to the red key, may be used editorially defining the 'next logical page; the link number 1, displayed in green and relating to the green key, may be used editorially defining a 'browse' among various pages. The position and mode of this display is optional but the relationship to the keys should be clear.

G.2 Previous Page

It is recommended that a 'Previous Page' key be included in the user controls. This key should toggle between the currently selected page and the page previously displayed.

G.3 Sub-title Key

It is recommended that a key be included to provide simple access to the sub-title service.

G.4 Other Methods of Page Selection

Notwithstanding the inclusion of the data defined in this code of practice in the transmission and the inclusion of the related keys on a users control unit, other methods of page selection may still be provided. While this code of practice includes a range of features appropriate to an enhanced service, it does not preclude other functions, either included in the transmission or in the decoder, that provide further features.

APPENDIX 8

THE AUTOMATIC PROGRAMMING OF VIDEO RECORDERS

LABELLING BY A SCHEDULED TRANSMISSION TIME

VIDEO PROGRAMME SERVICE DATA (VPS)

Section 13.3 of this specification defines the procedure for labelling broadcast programmes using a transmission time. The label is the SCHEDULED rather than the ACTUAL time and date of broadcast. This information together with identification of the programme source and country of origin is transmitted by format 2 packets 8/30 for 625 line applications and packets 4/T/30 for 525 line applications. The detailed interpretation of this data is described in Appendix 4 of this specification.

User Friendly Programming

For a video recorder to react to a label, the scheduled time and date must be entered in the recorder memory. To carry out this function manually, e.g. from a key pad, is inconvenient and can give rise to errors. Since comprehensive teletext services always include broadcast programme information on dedicated pages, these pages can form the basis of an highly user friendly method of programming. The method is defined in section 28 of this specification.

Programming by Teletext Pages

While it is very convenient to use the broadcast programme teletext pages to write labels to the memory of a video recorder, it is also essential to retain editorial freedom in the format of such pages. Equally it is essential to separate machine operating data from display data. The method defined in section 28 of this specification does not require any restrictions in respect of the displayed data. The page includes dedicated packets with Y=26, in which given data groups correspond with items in the displayed page. The user can position a cursor against any displayed programe item. Operating a "record this" key relates the cursor position to a coresponding data group in the packet with Y=26 and causes the programme item to be placed in the recorder memory.

Transmission Considerations

Where a number of transmission sources are available, the video recorder can be arranged to cycle through all those for which it has been programmed, while it is in the standby mode. To allow for reception and processing it is recommended that the format 2 packet 8/30 or 4/T/30 be transmitted approximately once per second. To allow for the mechanical startup time of the recorder it is recommended that the label in these packets is transmitted 10 seconds before the actual programme start time.

Since the data in the packet with Y=26 and that in the format 2 packet 8/30 or 4/T/30 is never displayed but they only need to correspond, in principle there is no restriction to the actual date and time digits used. However for reasons of operating convenience an actual time may be considered desirable, either local or universal. Since some simple equipment is likely to be in use that only responds to the format 2 packets 8/30 or 4/T/30 and hence must be manually programmed with the scheduled time, it may be considered that local time is to be preferred. In which case the "country of origin" data can automatic indication of time difference.

APPENDIX 9 AUTOMATIC PROGRAMMING OF VIDEO RECORDERS
LABELLING BY AN ARBITRARY NUMBER

The teletext Broadcast Data Packet 8/30 format 1 (BDSP, see 13.2) includes sufficient information to identify the starting and finishing time of broadcast programmes. This may be used for such purposes as the automatic programming of video recorders. It includes a statement of date and time in internationally standardized form (see 13.2.5,6) which allows a local clock to be synchronized and which allows operation in the absence of a local clock.

The BDSP contains a 16-bit Network Indentification (NI) code (see 13.2.3) which indicates a particular broadcast network. To allow for regional variations and to allow for different programme providers to use the same channel the NI code may vary between programmes. The NI codes are allocated such that those likely to be received at a common point differ from each other by at least 3 of the 16 bits, to provide protection against single-bit errors.

The BDSP contains a 1st and 2nd short programme label (SPL 1 and SPL 2 see 13.2.7,8). In general, no importance attaches to whether a particular 16-bit label appears as SPL1, SPL2 or both. A decoder searching for a particular programme may look for one or more NI codes in combination with a particular SPL, either as SPL1, SPL2 or both. The SPLs in use nearby in time on a particular network will generally differ from each other in at least 3 of the 16 bits, to provide protection against single-bit errors.

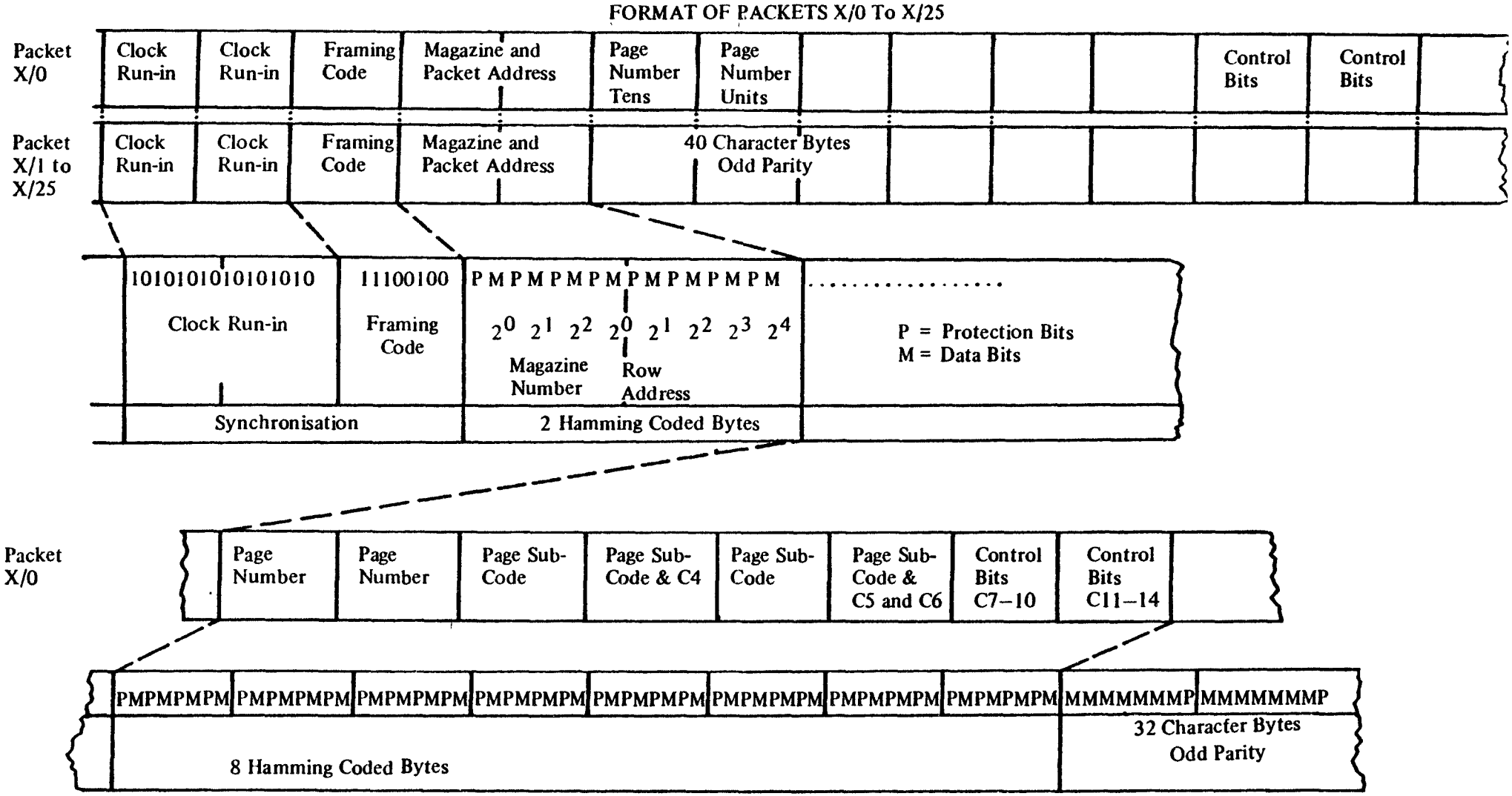
The BDSP is normally broadcast once per second, synchronous with the UTC seconds change (The time and date information are one second in advance). This synchronism allows a decoder to to scan several channels at a regular rate of one channel per second.

Some principles of decoder design are now given.
1) In order to provide sufficient ruggedess and to permit future extension it is recommended that three consecutive receptions each of a wanted NI together with a wanted SPL (each time as either SPL1, SPL2 or both) be the 'START' condition.
2) Three receptions each failing the test of 1) above shall be the 'STOP' condition.
3) Any 'wanted 16-bit code may be accepted with a single bit error.

Certain 16-bit codes will be allocated for fixed functions, such as a pause in transmission. Paticular sequences of labels that form a pattern can be used to provide advance information of the instant of change. An alternative service can use a deterministic sequence of labels, rather than a fixed label to identify some programmes.

A decoder must at least contain a list of the NI/SPL combinations corresponding to the desired programmes. Operation is simplified if the expected tuner channel and a 'time window' are also known for each programme. The time windows also allow potential clashes to be identified at the programming stage. This information may be loaded by manual keying using information from printed journals or the television screen. Barcode readers can reduce the possibilities of error. The techniques similar to those described in section 28 can be used to allow user friendly programming via teletext. Since the database necessary to operate this service can be large some broadcasters feel that rather than use teletext the Independent Data Service (see section 21) would be more appropriate. In this case the data could be transmitted at less frequent intervals in highly compressed form including suitable error protection. Schedules for many services for several weeks could be stored and updated as required. The decoder designer would have freedom concerning presentation and selection functions.

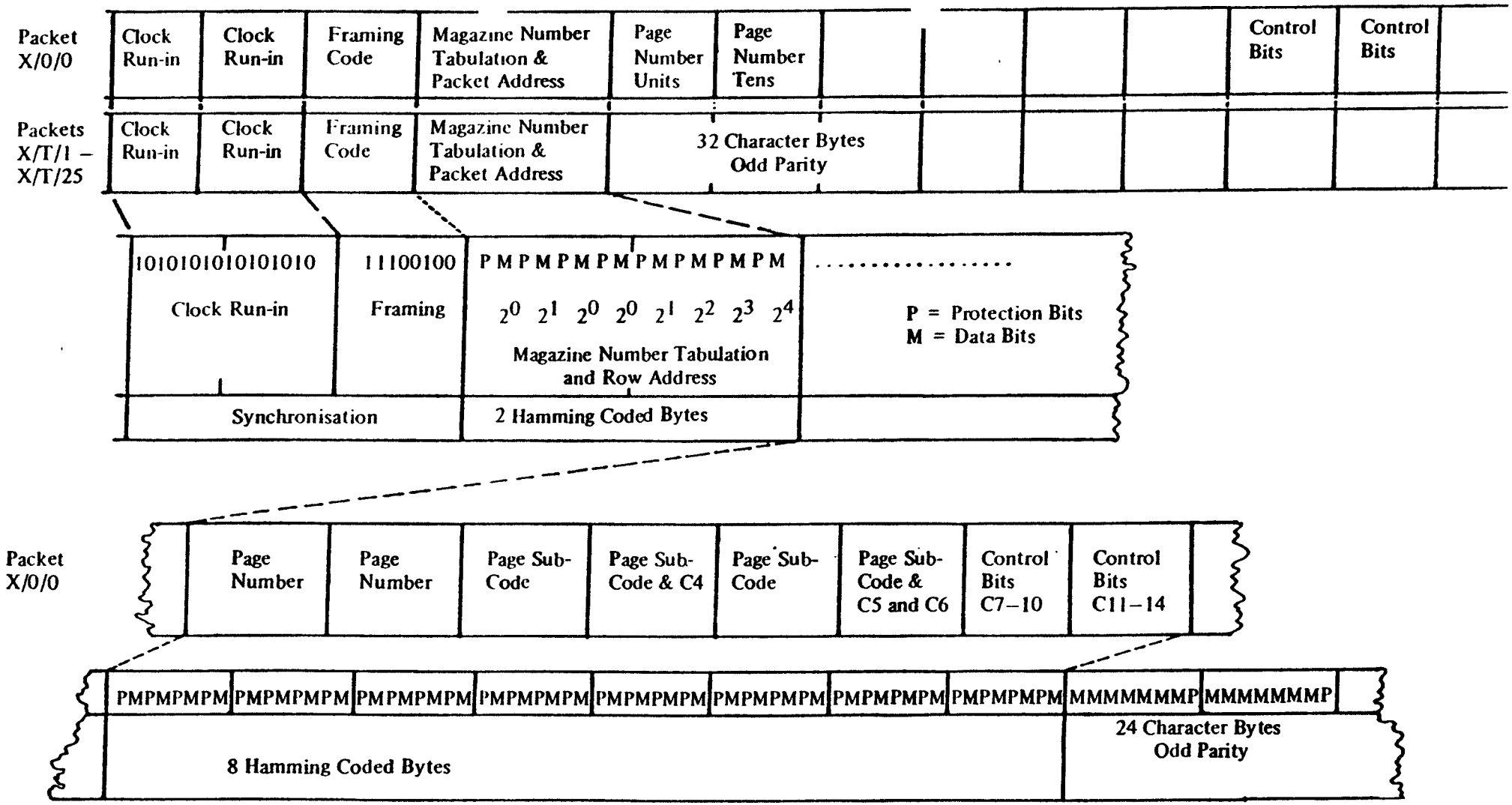
This approach, using arbitrary 16-bit numbers as labels and a standardized code for programme listing is independent of transmission or communication media. It can be used with any data transmission method or a hybrid system where listing and labels are communicated by different media.



NOTE In all cases the LEAST SIGNIFICANT bit is transmitted first

Figure 1(a)

FORMAT OF PACKETS X/0/0 To X/T/25



NOTE (1) In all cases the LEAST SIGNIFICANT BIT is transmitted first.

NOTE (2) Packets X/1/24 bytes 22 to 25 carry the cyclic redundancy check digit for packets with Y=26 and Y=28; bytes 30 to 33 carry the cyclic redundancy check digit for the basic page. This transmission of the two check digits is in addition to the transmission in packets with Y=27.

Figure 1(b)

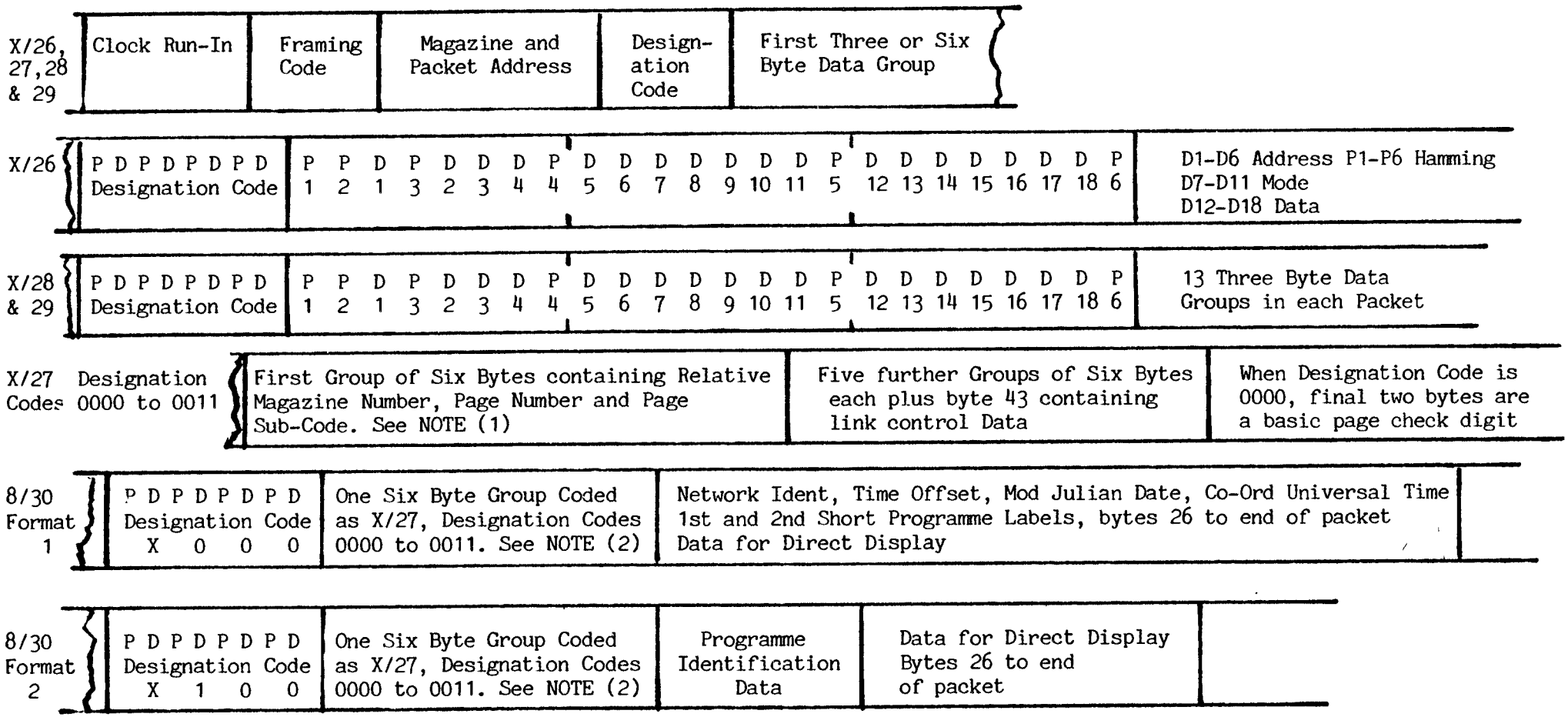


Figure 2(a) FORMAT OF PACKETS X/26 X/27 X/28 X/29 AND 8/30

NOTE (1) P=Hamming Bit D=Data Bit

NOTE (2) These six bytes have the same format as bytes 6 to 11 of the page header packet, see figure 1(a). The bits corresponding to the Control Bits C4, C5 and C6 in the page header packet are used in this sequence to change the magazine number from that in bytes 4 and 5 of the packet X/27. Setting any of these bits to '1' complements the corresponding magazine number bit.

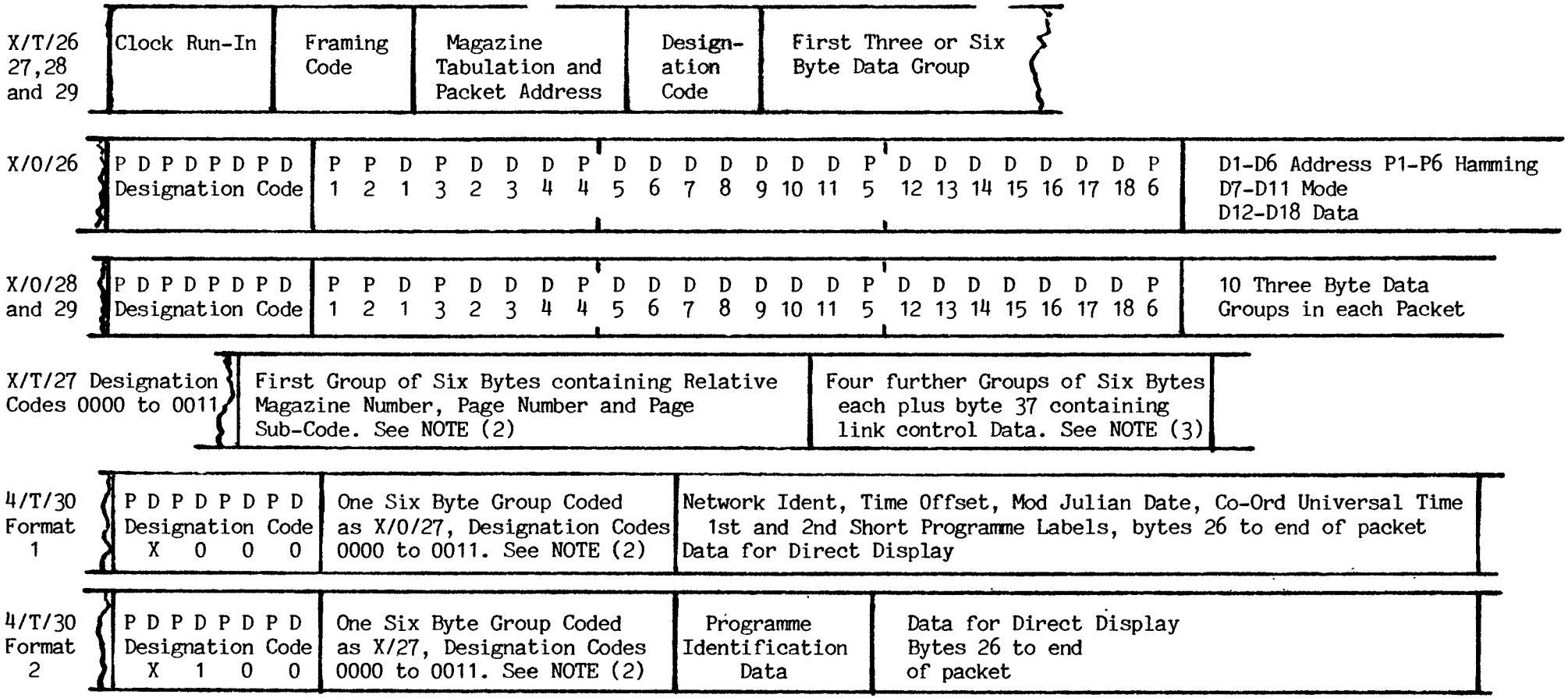


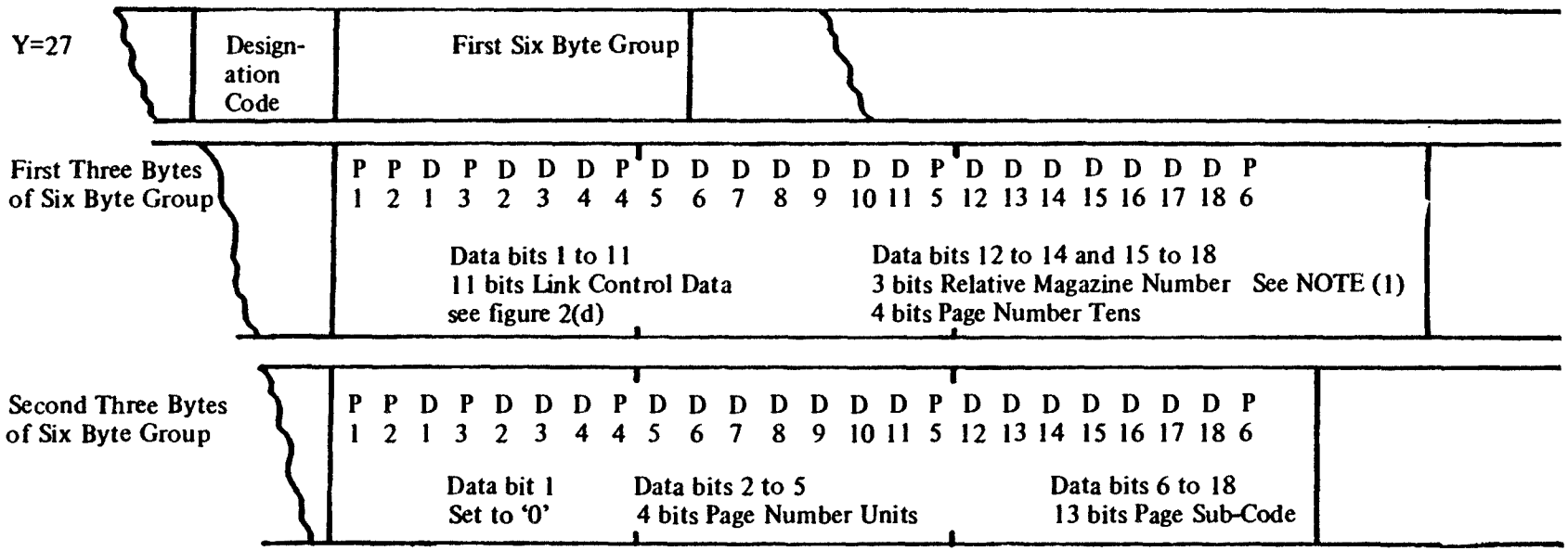
Figure 2(b) FORMAT OF PACKETS X/T/26 X/T/27 X/T/28 4/T/30

NOTE (1) P=Hamming Bit D=Data Bit

NOTE (2) These six bytes have the same format as bytes 6 to 11 of the page header packet, see figure 1(a). The bits corresponding to the Control Bits C4 and C5 in the page header packet are used in this sequence to change the magazine number from that in bytes 4 and 5 of the packet X/0/27. Setting any of these bits to '1' complements the corresponding magazine number bit.
C6 corresponds to the Tabultion bit T and has no meaning in this application.

NOTE (3) The final group of six bytes in packets X/1/27 designation code 0000 carry the cyclic redundancy digits for the basic page and packets with Y=26 and Y=28.

FORMAT OF PACKETS WITH Y=27 DESIGNATION CODES 0100 to 0111



NOTE (1) The three Relative Magazine bits are used to change the magazine number from that in bytes 4 and 5 of the packet with Y=27. Setting any of these bits to '1' complements the corresponding magazine number bit.
In the case of 525 line systems, the bit corresponding to the tabulation bit in bytes 4 and 5 of the packet with Y=27 is set to '0'.

In all cases the LEAST SIGNIFICANT bit is transmitted first.

Figure 2(c)

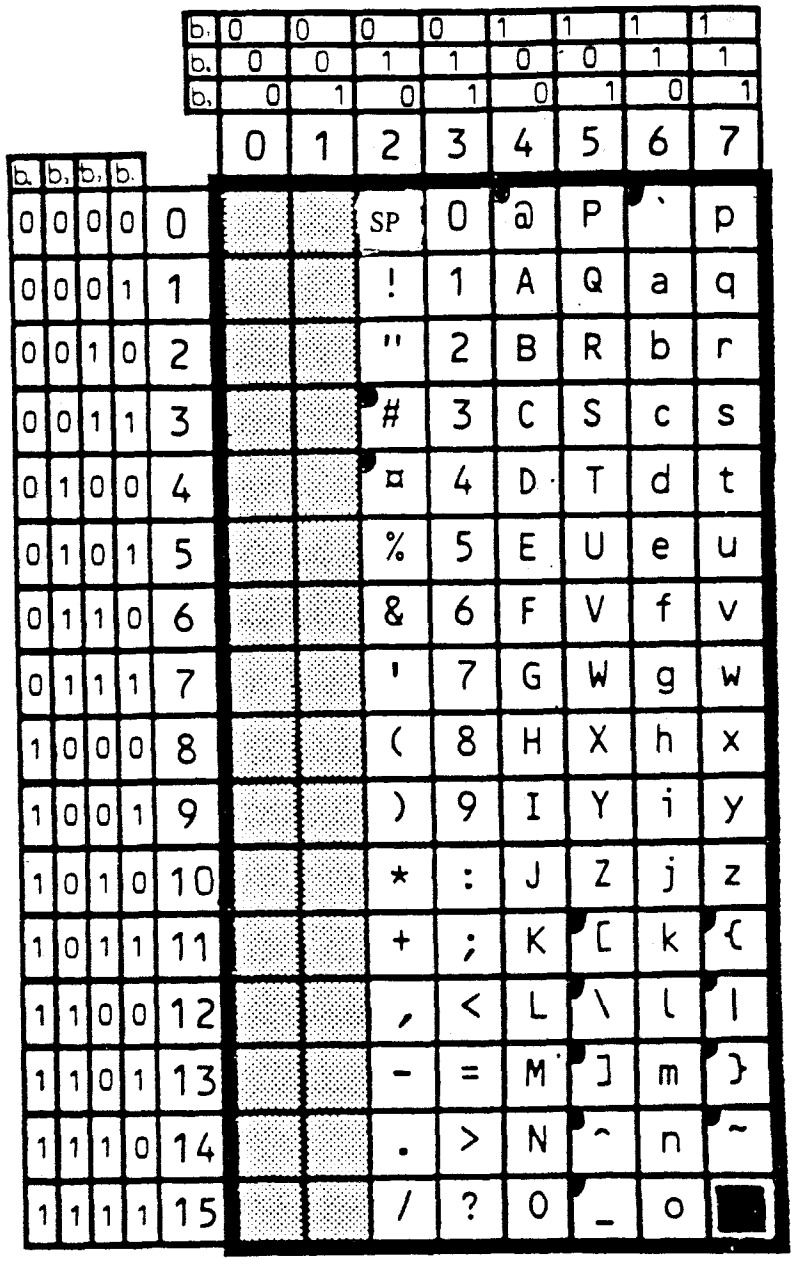
LINK CONTROL DATA

PACKETS WITH Y=27 DESIGNATION CODES 0100 TO 0111

Interpretation of data bit 1 of the second three bytes of a six byte group		
Bit 1	set to 0	interpretation of bits 1 to 10 below applies.
	set to 1	no interpretation is assigned to bits 1 to 10 below.

Interpretation of data bits 1 to 11 of the first three bytes of a six byte group			
1	Bit 11	set to 0	interpretation of bits 1 to 10 below applies.
		set to 1	no interpretation is assigned to bits 1 to 10.
2	Bit 10	Bit 9	
	0	0	Linked pages not chained
	0	1	Linked pages chained, start of chain
	1	0	Linked pages chained, end of chain
	1	1	Linked pages chained, within a chain
3	Bit 8	Bit 7	
	0	0	Linked page contains data in 7 bits plus parity bit format
	0	1	Not assigned, bits 6 to 1 below also not assigned
	1	0	Not assigned, bits 6 to 1 below also not assigned
	1	1	Linked page contains data in 8 bit format
4	Bits 6 to 1		
	000000		Not a pseudo page
	000001		Pseudo page for overwriting
	000010		Pseudo page for scrolling
	000011		Pseudo page for DRCS downloading, 1st group
	000100		Pseudo page for DRCS downloading, 2nd group
	000101		Pseudo page for reformatted data
	000110		Pseudo page for page format extension
	000111		Pseudo page for ideographic character downloading, 1st group
	001000		Pseudo page for ideographic character downloading, 2nd group
	001001		Pseudo page for geometric data
	001010		Pseudo page for photographic data
	001011		Psuedo page for musical sound data
	001100 to 111110		Not assigned
	111111		No linked page specified, page address FF3F7F transmitted.

Figure 2(d) LINK CONTROL DATA FOR COMPOSITIONAL APPLICATIONS



b4 b3 b2 b1	0	1	2	3	4	5	6	7
0 0 0 0 0			SP	0	@	P	`	p
0 0 0 1 1			!	1	A	Q	a	q
0 0 1 0 2			"	2	B	R	b	r
0 0 1 1 3			#	3	C	S	c	s
0 1 0 0 4			¤	4	D	T	d	t
0 1 0 1 5			%	5	E	U	e	u
0 1 1 0 6			&	6	F	V	f	v
0 1 1 1 7			'	7	G	W	g	w
1 0 0 0 8			(	8	H	X	h	x
1 0 0 1 9			)	9	I	Y	i	y
1 0 1 0 10			*	:	J	Z	j	z
1 0 1 1 11			+	;	K	[	k	{
1 1 0 0 12			,	<	L	\	l	|
1 1 0 1 13			-	=	M	]	m	}
1 1 1 0 14			.	>	N	^	n	~
1 1 1 1 15			/	?	O	_	o	

Figure 3 LATIN ALPHABET PRIMARY CHARACTER SET GO CODE TABLE (ISO 6937/2)

Optional Variations apply to marked positions see figure 3(a)

The Character in position 7/15 occupies an area equivalent to that of any character that does not include a descender. It is thus a rectangle surrounded by the background colour. In US applications character positions 2/3, 2/4 and 5/15 are not available for optional variations and the character in position 2/4 is '$'.

TABLE POSITION	CZECHO-SLOVAK	ENGLISH (UK)	ENGLISH (US)	FRENCH (BELGIAN)	GERMAN	ITALIAN	POLISH	PORTUGESE/ SPANISH
2/3	#	£	NA	é	#	£	#	ç
2/4	ů	$	NA	ï	$	$	ń	$
4/0	č	@	@	à	§	é	ą	¡
5/11	ť	<	[	ë	Ä	°	ź	á
5/12	ž	½	\	ê	Ö	ç	ś	é
5/13	ý	>	[	ù	Ü	>	ł	í
5/14	í	^	^	î	^	^	ć	ó
5/15	ř	#	NA	#	_	#	ó	ú
6/0	é	_	`	è	°	ù	ę	¿
7/11	á	¼	{	â	ä	à	ż	ü
7/12	ě	‖	|	ô	ö	ò	ś	ñ
7/13	ú	¾	}	û	ü	è	ł	è
7/14	š	÷	~	ç	ß	ì	ź	à

Figure 3(a) part 1 LATIN ALPHABET OPTIONAL VARIATIONS

TABLE POSITION	RUMANIAN	SERBO-CROAT	SWEDISH FINNISH	TURKISH
2/3	#	#	#	TL
2/4	¤	½	¤	ğ
4/0	Ţ	Č	É	İ
5/11	Â	Ć	Ä	ş
5/12	Ş	Ž	Ö	Ö
5/13	Ă	Đ	Å	ç
5/14	Î	Š	Ü	ü
5/15	ı	ë	—	Ğ
6/0	ţ	č	é	ı
7/11	â	ć	ä	ş
7/12	ş	ž	ö	ö
7/13	ă	đ	å	ç
7/14	î	š	ü	ü

Figure 3(a) continued LATIN ALPHABET OPTIONAL VARIATIONS

Note the character TL in position 2/3 is the Turkish currency sign

OPTION NUMBER C12 C13 C14	CODE IN PACKETS WITH Y=28 SEE FIGURE 14 CHARACTER SET NUMBER 6	38	40	55
1 000	English	Polish	English(US)	English
2 001	German	German	German	German
3 010	Swedish/ Finnish	Swedish/ Finnish	Reserved	Swedish/
4 011	Italian	Italian	Italian	Italian
5 100	French	French	French	French
6 101	Portugese/ Spanish	Serbo- Croat	Portugese/ Spanish	Portugese/ Spanish
7 110	Czecho- Slovak	Czecho- Slovak	Reserved	Turkish
8 111	Reserved	Reserved	Reserved	Reserved

Figure 3(b) LATIN ALPHABET OPTIONAL VARIATIONS TO G0 CODE TABLE

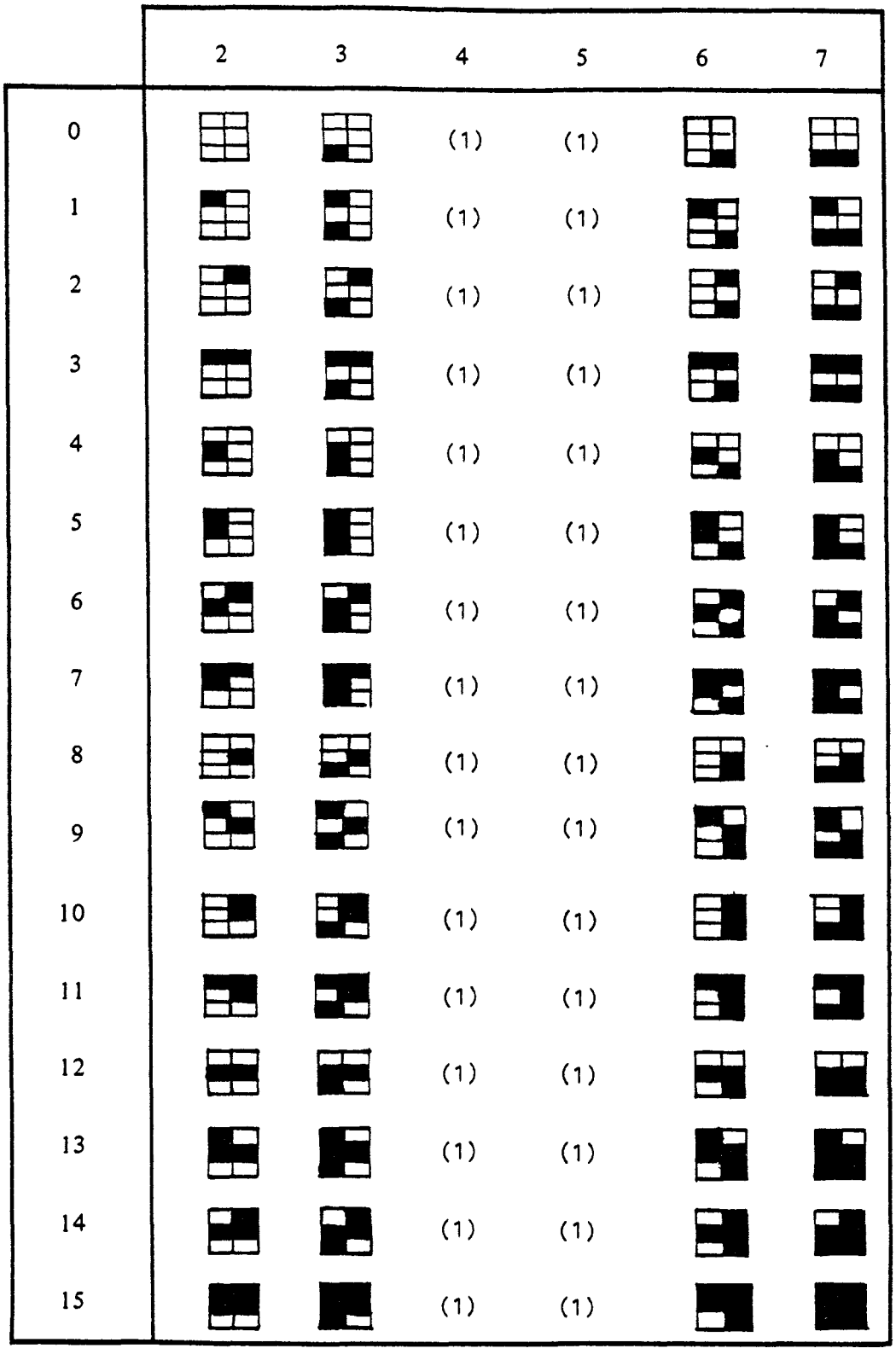


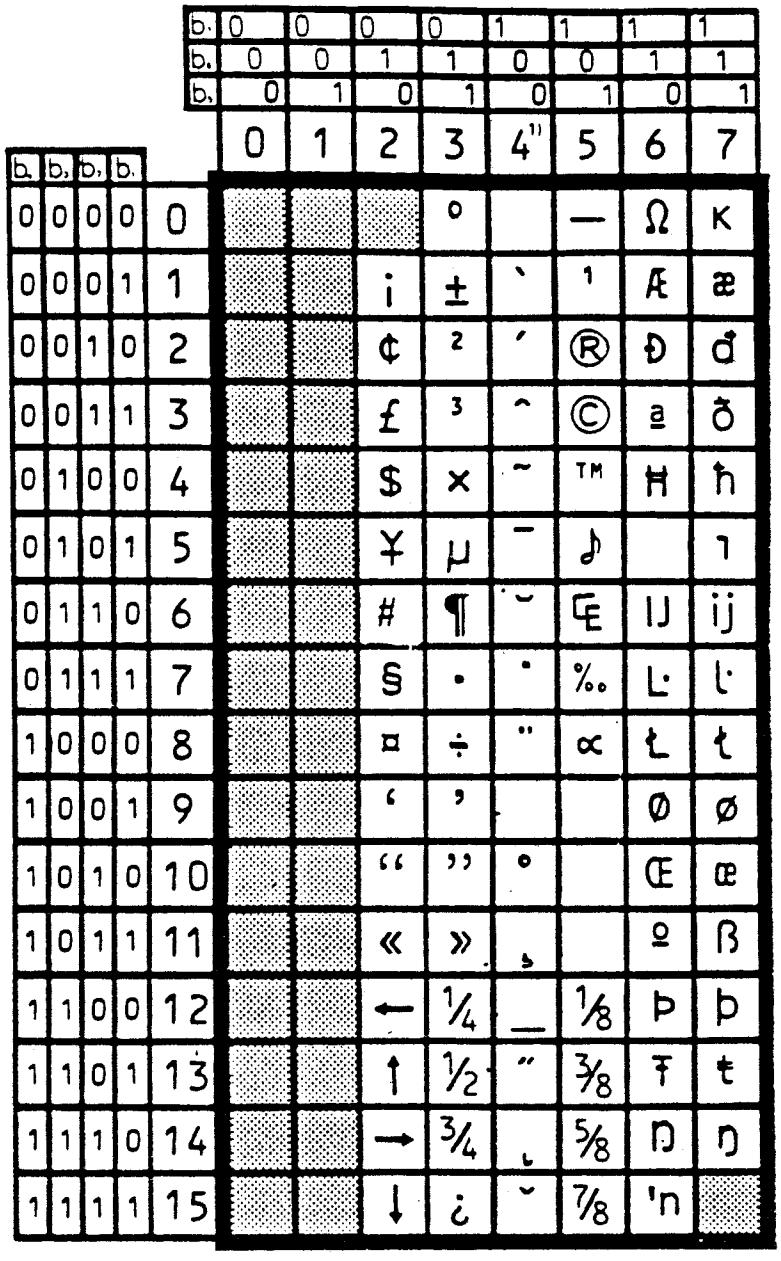
Figure 4 MOSAIC GRAPHICS G1 CHARACTER SET (Shown in Contiguous Form)

(1) Columns 4 and 5 contain the corresponding characters from the G0 set.
Shaded areas of characters in columns 2, 3, and 7 are displayed in the foreground colour.
Bit allocations are the same as for the primary character set, see figure 3

	0	1
0	Alpha Black (4)	Mosaic Black (4)
1	Alpha Red	Mosaic Red
2	Alpha Green	Mosaic Green
3	Alpha Yellow	Mosaic Yellow
4	Alpha Blue	Mosaic Blue
5	Alpha Magenta	Mosaic Magenta
6	Alpha Cyan	Mosaic Cyan
7	Alpha White (1)	Mosaic White
8	Flash	Conceal (2)
9	Steady (1,2)	Contiguous Mosaic (1,2)
10	End Box (1,2)	Separated Mosaic (2)
11	Start Box (3)	(5)
12	Normal Height (1,2)	Black Background(1,2)
13	Double Height	New Background (2)
14	Double Width (4)	Hold Mosaic (2)
15	Double Size (4)	Release Mosaic (1)

Figure 5 CONTROL CHARACTERS FOR SPACING ATTRIBUTES

(1) Presumed at the start of each display row
(2) Action "Set At", others are "Set After"
(3) Two consecutive codes transmitted, action takes place between them
(4) No action at level 1
(5) Reserved Code



b4 b3 b2 b1	0	1	2	3	4	5	6	7
0 0 0 0 0				°		—	Ω	K
0 0 0 1 1			¡	±	`	¹	Æ	æ
0 0 1 0 2			¢	²	´	®	Đ	đ
0 0 1 1 3			£	³	^	©	ª	ð
0 1 0 0 4			$	×	~	™	Ħ	ħ
0 1 0 1 5			¥	µ	¯	♪		ı
0 1 1 0 6			#	¶	˘	Ꞙ	IJ	ij
0 1 1 1 7			§	•	˙	‰	Ŀ	ŀ
1 0 0 0 8			¤	÷	¨	∝	Ł	ł
1 0 0 1 9			‘	’			Ø	ø
1 0 1 0 10			“	”	°		Œ	œ
1 0 1 1 11			«	»	˛		º	ß
1 1 0 0 12			←	¼	_	⅛	Þ	þ
1 1 0 1 13			↑	½	˝	⅜	Ŧ	ŧ
1 1 1 0 14			→	¾	˛	⅝	Ŋ	ŋ
1 1 1 1 15			↓	¿	ˇ	⅞	ʼn	

Figure 6 LATIN ALPHABET SUPPLEMENTARY CHARACTER SET G2 CODE TABLE (ISO 6937/2)

Column 4 contains diacritical marks for association with G0 set characters.
The Character in position 7/15 occupies an area equivalent to that of any character that does not include a descender. It is thus a rectangle surrounded by the background colour.
The Character in position 2/0 is to be interpreted as SPACE.
The Characters in positions 5/6, 5/7 and 5/8 are in addition to those specified in ISO 6937/2.
The Character in position 5/6 represents the European Currency Symbol

Blank positions are 'transparent' permitting the display of any character otherwise overwritten.

COLOUR ENTRY NUMBERS		COLOUR	DOWNLOADING BIT COMBINATIONS		
			R	G	B
COLOUR TABLE NUMBER 1	0	BLACK	0000	0000	0000
	1	RED	1111	1111	1111
	2	GREEN	0000	0000	0000
	3	YELLOW	1111	1111	0000
	4	BLUE	0000	0000	1111
	5	MAGENTA	1111	0000	1111
	6	CYAN	0000	1111	1111
	7	WHITE	1111	1111	1111
COLOUR TABLE	8	TRANSPARENT	DONT CARE VALUES		
	9	REDUCED INTENSITY RED	0111	0000	0000
	10	REDUCED INTENSITY GREEN	0000	0111	0000
	11	REDUCED INTENSITY YELLOW	0111	0111	0000
	12	REDUCED INTENSITY BLUE	0000	0000	0111
	13	REDUCED INTENSITY MAGENTA	0111	0000	0111
	14	REDUCED INTENSITY CYAN	0000	0111	0111
	15	REDUCED INTENSITY GREY	0111	0111	0111
COLOUR TABLE NUMBER 3	16 TO 23		REDEFINABLE, DEFAULT ENTRIES VALUES 0 TO 7		
COLOUR TABLE NUMBER 4	24 TO 31		REDEFINABLE, DEFAULT ENTRIES VALUES 0 TO 7		

DCLUT	
0	DEFAULT BLA
1	DEFAULT RED
2	DEFAULT GR
3	DEFAULT YEL

The Downloading Bit Combinations are transmitted in the order red, green, blue, in each case with the least significant bit transmitted first (see Section 14.8).

Figure 7 COLOUR MAP

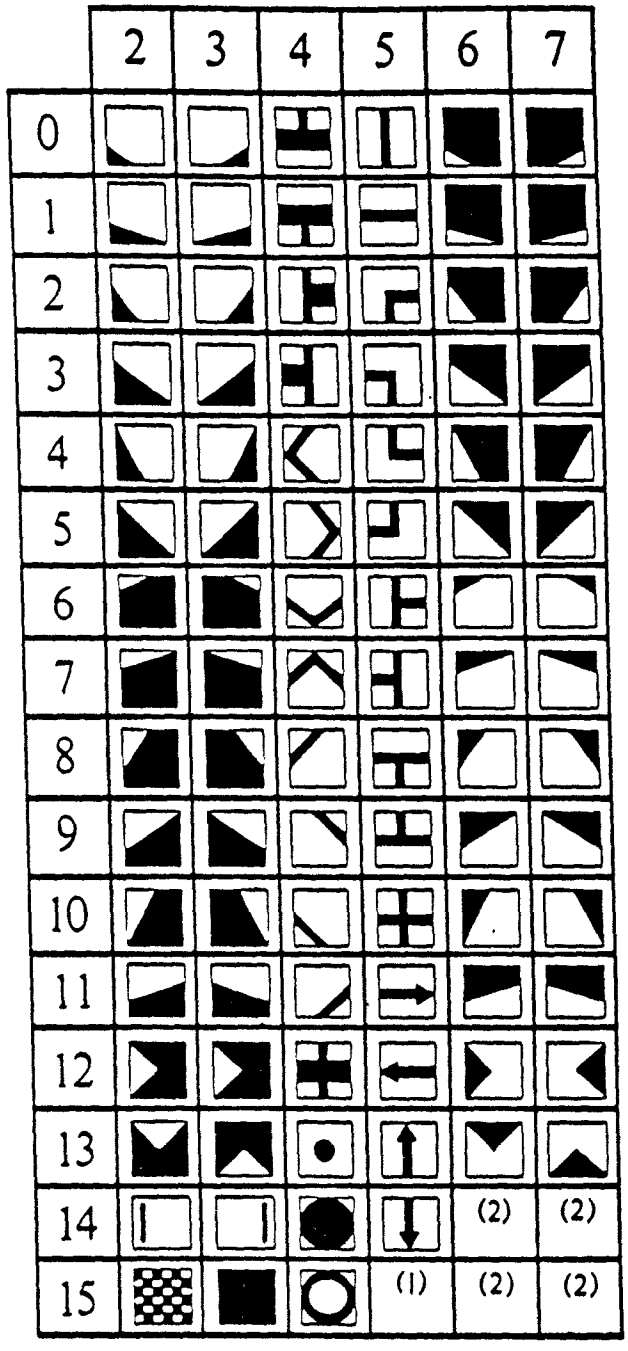


Figure 8

SMOOTHED MOSAIC GRAPHIC CHARACTER SET (shown in contiguous form)
AND LINE DRAWING CHARACTER SET G3 CODE TABLE

The character at position 2/15 represents the activation of alternate dots of the matrix.

(2) No character is assigned to these codes. Should they occur the Level 1 character shall be displayed.

The bit allocations are the same as for the primary character set.

(1) This character permits display of Background Colour.

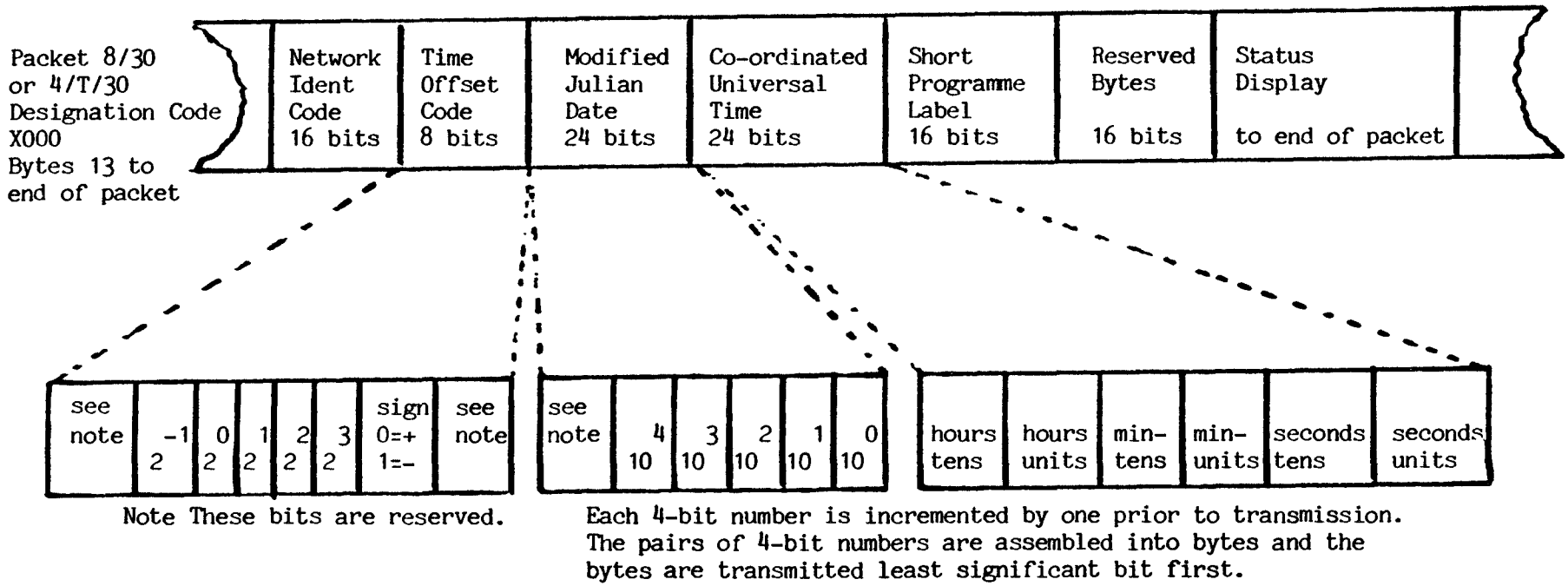
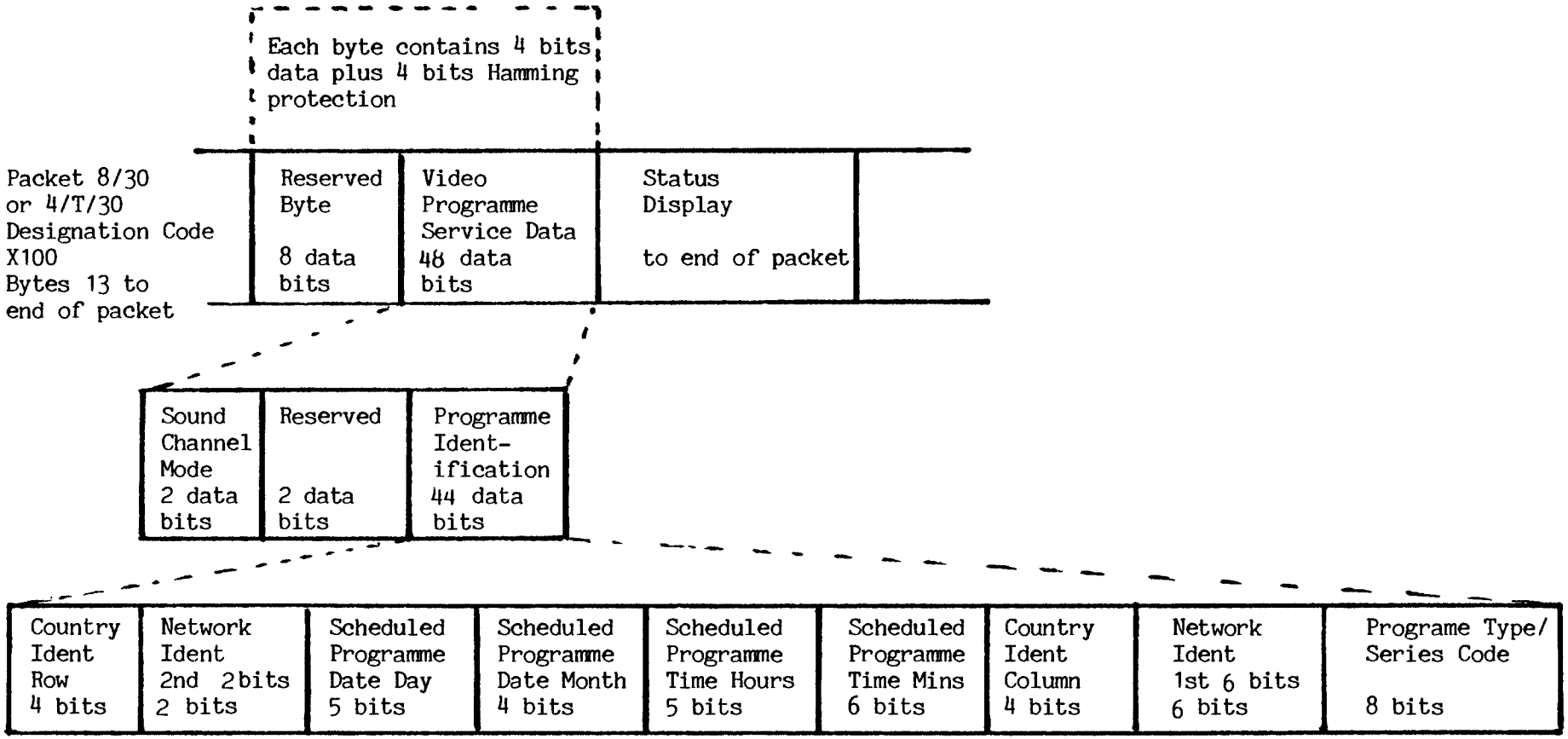


Figure 9 BROADCAST SERVICE DATA PACKET FORMAT 1 BIT ALLOCATION



The data bits in each data word are transmitted most significant bit first.
Groups of 4 data bits are assembled with Hamming protection bits into bytes.

Figure 9(a) BROADCAST SERVICE DATA PACKET FORMAT 2 BIT ALLOCATION

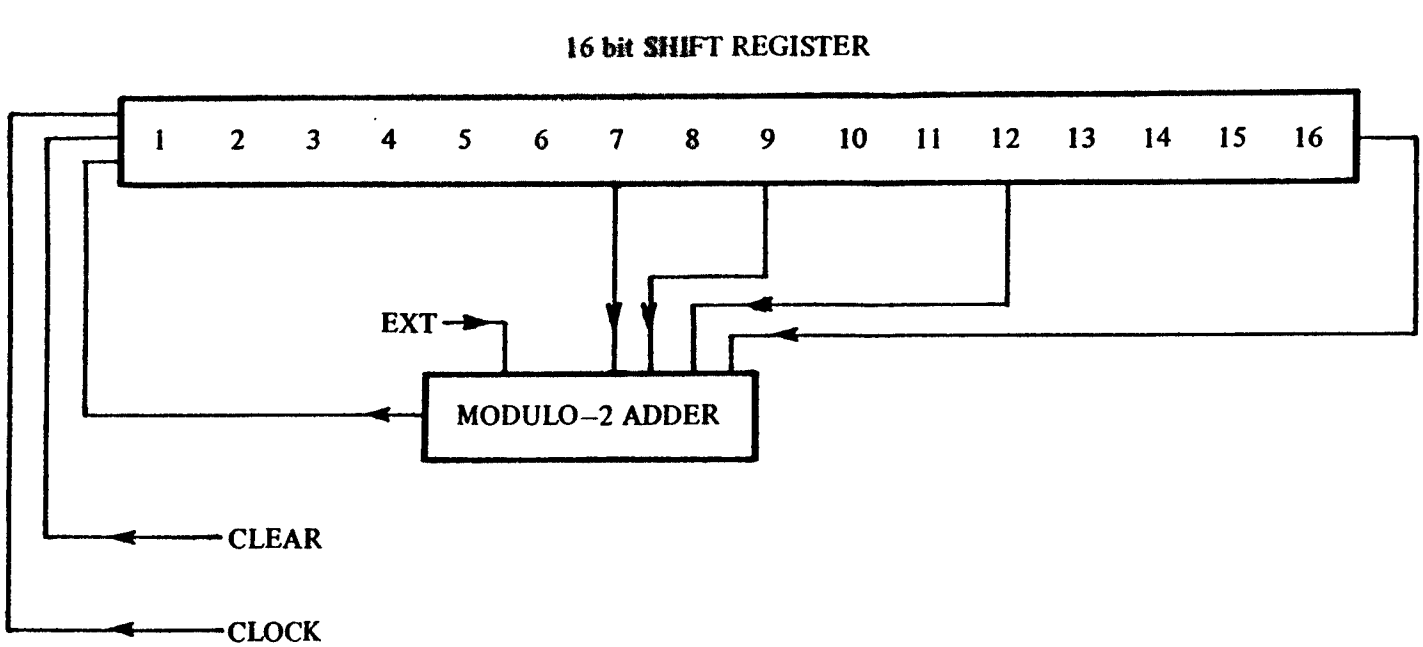


Figure 10

CHECK WORD GENERATION

In the example shown a 16 bit shift register has as input the modulo–2 sum of an external input and the contents of the 7th, 9th, 12th and 16th stages of the register. Initially the register is cleared to 'all zeros'. During a sequence of 8192 clock pulses, the first 24 character bytes (192 bits) of the page header packet and the following character bytes of packets with the value of 'Y' up to 25, in conventional transmission order, form the input. Any absent packets are considered to contain the character SPACE (2/0) throughout. In each byte, the bit order is b8 to b1 inclusive. This order, that is the reverse of that used in the transmission sequence, is to facilitate decoder operation where the data used is that stored in the page memory.

At the end of the generating process the contents of the register are the basic page check word and it is transmitted along the register beginning with the bit held in the first stage.

The transmission order for the two byte group resulting from the 16 bit cyclic redundancy check on the page is bits 9 to 16 followed by bits 1 to 8 inclusive.

MODE	FUNCTION	DATA BITS 1 to 7
00000	FULL SCREEN COLOUR	Bits 1 to 5 Invoke an Entry from the Colour Map. Bits 6 and 7 are set to '0'
00001	FULL ROW COLOUR	Bits 1 to 5 Invoke an Entry from the Colour Map. Bits 6 and 7 set to '0' single row; Bits 6 and 7 set to 1 contiguous rows; Other Codes, ignore data bits
00010	REDEFINES REST OF PACKET	When data bits set to '0' Section 14.7 applies
00011	REDEFINES REST OF PACKET	When data bits set to '0' Section 14.7 applies
00100	SET CURSOR POSITION	Cursor position, left to right is defined by codes 4/0 to 6/7, other codes are to be interpreted as 'No Cursor'
00101	START SCROLL REGION	Data bits 1 to 5 defines full row scroll region colour, bits 6 and 7 set to '0'
00110	END SCROLL REGION	Data bits 1 to 5 define full row colour from next row to lower border area inclusively, bits 6 and 7 set to '0'
00111	ADDRESSES DISPLAY ROW '0'	When data bits are set to '0' Section 14.6.4.1 applies
01000	VPT DATA	Row Address bits define Country, Data bits 1-7 define Source
01001	VPT DATA	Row Address bits define Date Months, Data bits 1-7 define Day
01010	VPT DATA	Row Address bits define Cursor Row, Data bits 1-7 define Starting Time Hours
01011	VPT DATA	Row Address bits define Cursor Row, Data bits 1-7 define Finishing Time Hours
01100	VPT DATA	Row Address bits define Cursor Row, Data bits 1-7 define Local Time Offset
01101	VPT DATA	Row Address bits invoke Series Code Funtion, Data bits 1-7 provide 'Series Code'
01110 TO 11110	NOT ASSIGNED	Ignore data bits
111111	PACKETS WITH Y=26 TERMINATOR	

Transmission order of bits representing the Mode Description Colour Map Entries is least significant bit first.

Figure 11 PACKETS WITH Y=26 MODE DESCRIPTION CODES FOR ROW ADDRESS GROUP

MODE	FUNCTION	DATA BITS 1 to 7
00000	FOREGROUND COLOUR	Bits 1 to 5 invoke an entry from the colour map. Bits 6 and 7 are set to '0'
00001	G1 SET	Bits 1 to 7 define the character. Block Mosaic is default character set
00010	G3 SET	Bits 1 to 7 define the character. Smoothed Mosaic is the default character set
00011	BACKGROUND COLOUR	Bits 1 to 5 invoke an entry from the colour map. Bits 6 and 7 are set to '0'
00100	LATCHING SHIFT	See Figure 12(a)
00101	SINGLE SHIFT	See Figure 12(b)
00110	PROGRAMME DELIVERY DATA	Address bits define Cursor Position in Row, data bits 1 - 7 see Section 28.
00111	ADDITIONAL FLASH CONTROLS	See Section 14.6.8
01000	G0 SET MODIFIED DESIGNATION	Bits 1 to 7 define a character set, see figure 14
01001	G1 SET MODIFIED DESIGNATION	Bits 1 to 7 define a character set, see figure 14
01010	G2 SET MODIFIED DESIGNATION	Bits 1 to 7 define a character set, see figure 14
01011	G3 SET MODIFIED DESIGNATION	Bits 1 to 7 define a character set, see figure 14
01100	NON-SPACING ATTRIBUTES	See Section 14.6
01101	1st DRCS	Bits 1 to 7 define a character from the 1st DRCS
01110	2nd DRCS	Bits 1 to 7 define a character from the 2nd DRCS
01111	CHARACTERS FROM G2 SET	Bits 1 to 7 define a character from the G2 Supplementary Set
10000 TO 11111	DIACRITICAL MARKS FROM COLUMN 4 OF G2 SET	Bits 1 to 7 define the associated G0 Primary Set Character

Transmission order of bits representing the Mode Description and colour entries is least significant bit first

Figure 12 PACKETS WITH Y=26 MODE DESCRIPTION CODES FOR CHARACTER-SPACE ADDRESS GROUPS

LATCHING SHIFT FUNCTIONS - SPACE GROUP MODE DESCRIPTION BITS SET TO 00100	
DATA BITS 1 TO 7	FUNCTION
0000000	LATCHING SHIFT TO INVOKED OR DEFAULT G0 PRIMARY CHARACTER SET
0000001	LATCHING SHIFT TO INVOKED OR DEFAULT G1 CHARACTER SET
0000010	LATCHING SHIFT TO INVOKED OR DEFAULT G2 SUPPLEMENTARY CHARACTER SET
0000011	LATCHING SHIFT TO INVOKED OR DEFAULT G3 CHARACTER SET
0000100	LATCHING SHIFT TO 1st DRCS
0000101	LATCHING SHIFT TO 2nd DRCS
0000110 TO 1111110	INVOKATION OF AND LATCHING TO CHARACTER SETS DEFINED IN FIGURE 14
1111111	CANCEL LATCHING SHIFT OR INVOKATION AND LATCHING SHIFT

The effect of a shift or combined invdkation and shift is cancelled by the transmission of a further shift or a combined invdkation and shift.

Figure 12(a) PACKETS WITH Y=26 LATCHING SHIFTS AND COMBINED INVOKATION AND LATCHING SHIFT

SINGLE SHIFT FUNCTIONS - SPACE GROUP MODE DESCRIPTION BITS SET TO 00101	
DATA BITS 1 TO 7	FUNCTION
0000000	SINGLE SHIFT TO INVOKED OR DEFAULT G0 PRIMARY CHARACTER SET
0000001	SINGLE SHIFT TO INVOKED OR DEFAULT G1 CHARACTER SET
0000010	SINGLE SHIFT TO INVOKED OR DEFAULT G2 SUPPLEMENTARY CHARACTER SET
0000011	SINGLE SHIFT TO INVOKED OR DEFAULT G3 CHARACTER SET
0000100	SINGLE SHIFT TO 1st DRCS
0000101	SINGLE SHIFT TO 2nd DRCS
0000110 TO 1111110	INVOKATION OF AND SINGLE SHIFT TO CHARACTER SETS DEFINED IN FIGURE 14
1111111	RESERVED

The effect of a shift or combined invokation and shift is cancelled by the transmission of a further shift or a combined invokation and shift.

Figure 12(b) PACKETS WITH Y=26 SINGLE SHIFTS AND COMBINED INVOKATION AND SINGLE SHIFT

Interpretation of the first group of 18 data bits in a packet with Y=28 of a page with designation code 0000 or 0010

18	17	16	15	Bit Numbers
0	0	0	0	Data Coded as 8 bit bytes, 7 bits data plus 1 parity bit
0	0	0	1	Data Coded as 8 bit bytes, with 8 data bits each
0	0	1	0	Data coded as 3 groups of 8 bit bytes, 18 data bits Hamming protected 24/18
0	0	1	1	Data coded as 8 bit bytes, 4 data bits Hamming protected 8/4

No interpretation is assigned to other combinations of bit values.

For the interpretation of bits number 1 to 14 see figure 13(b).

Figure 13(a) Data bit organisation and protection

Interpretation of the first group of 18 data bits in a packet with Y=28 of a page with designation code 0000 or 0010

8	7	6	5	4	3	2	1	Bit Numbers
0	0	0	0	0	0	0	0	Basic Page with Standard Character Position and Row Format
0	0	1	*	*	*	*	*	Overwriting Pseudo Page
0	1	0	*	*	*	*	*	Scrolling Pseudo Page
0	*	*	1	*	*	*	*	Page Format Extension Page, Other Than Last of Group
0	*	*	0	*	*	*	*	Page Format Extension Page, Last of Group
0	*	*	*	*	*	0	0	Page Format Extension Page, Left Hand Page
0	*	*	*	*	*	0	1	Page Format Extension Page, 2nd from Left Hand Page
0	*	*	*	*	*	1	0	Page Format Extension Page, 3rd from Left Hand Page
0	*	*	*	*	*	1	1	Page Format Extension Page, 4th from Left Hand Page
0	*	*	*	0	0	*	*	Page Format Extension Page, Top Row of Pages
0	*	*	*	0	1	*	*	Page Format Extension Page, 2nd from Top Row of Pages
0	*	*	*	1	0	*	*	Page Format Extension Page, 3rd from Top Row of Pages
0	*	*	*	1	1	*	*	Page Format Extension Page, 4th from Top Row of Pages

Figure 13(b) Part 1 (Bit 8 set to 0)

continued from figure 13(b) Part 1

Interpretation of the first group of 18 data bits in a packet with Y=28 of a page with designation code 0000 or 0010

8	7	6	5	4	3	2	1	Bit Numbers
1	0	0	0	0	0	0	0	Data for DRCS Downloading, First Group
1	0	0	0	0	0	0	1	Data for DRCS Downloading, Second Group
1	0	0	0	0	0	1	0	Data for Ideographic Character Downloading, First Group
1	0	0	0	0	0	1	1	Data for Ideographic Character Downloading, Second Group
1	0	0	0	0	1	0	0	Reformatted Data
1	0	0	0	0	1	0	1	Terminal Equipment Addressing Page
1	0	0	0	0	1	1	1	Musical Sound Data
1	0	0	0	1	0	0	0	Geometric Data Profile '0' Option 1
1	0	0	0	1	1	0	0	Geometric Data Profile '0' Option 2
1	0	0	0	1	0	0	1	Geometric Data Profile '1' Option 1
1	0	0	0	1	1	0	1	Geometric Data Profile '1' Option 2
1	0	0	0	1	0	1	0	Geometric Data Profile '2' Option 1
1	0	0	0	1	1	1	0	Geometric Data Profile '2' Option 2
1	0	0	0	1	0	1	1	Geometric Data Profile '3' Option 1
1	0	0	0	1	1	1	1	Geometric Data Profile '3' Option 2
1	0	0	1	0	0	0	0	Photographic Data Option 1
1	0	0	1	1	0	0	0	Photographic Data Option 2
0	*	*	0	0	0	0	0	Page has Standard Character Position and Row Format

No interpretation is assigned to other combinations of bit values *= Dont Care Value

This interpretation is only assigned to the values of bits 1 to 8, when bits 9 to 14 are set to 0.
For the interpretation of bits number 15 to 18 see figure 13(a).

Figure 13(b) Completion (Bit 8 set to 1) Data bit organisation and protection

CHARACTER SET	CODE	NAME	CODE TABLE FIGURE
0 to 5	0000000 to 0000101	Reserved for other applications	
6	0000110	1st Latin Primary Set	3 3(a) 3(b)
7	0000111	1st Latin Supplementary Set	6
8	0001000	Block Mosaic Set	4
9	0001001	Smoothed Mosaic Set	8
10	0001010	Arabic Primary Set	15(a)
11	0001011	Arabic Supplementary Set	15(b)
12	0001100	Cyrillic Primary Set	27 27(a)
13	0001101	Cyrillic Supplementary Set	
14	0001110	Devanagari Primary Set	34
15	0001111	Devanagari Supplementary Set	35
16	0010000	Greek Primary Set	28
17	0010001	Greek Supplementary Set	
18	0010010	Hangul Single Byte Set	57
19	0010011	Hangul Two Byte Set	56 56(a) 56(b)
20	0010100	Hebrew Primary Set	
21	0010101	Hebrew Suplementary Set	
22	0010110	Burmese Primary Set	32
23	0010111	Burmese Supplementary Set	
24	0011000	Lao Primary Set	33
25	0011001	Lao Supplementary Set	
26	0011010	Malayalam Primary Set	50
27	0011011	Malayalam Supplementary Set	51
28	0011100	Singhalese Primary Set	52
29	0011101	Singhalese Supplementary Set	53
30	0011110	Thai Primary Set	31
31	0011111	Thai Supplementary Set	
32	0100000	Katakana Primary Set	59
33	0100001	Katakana Supplementary Set	
34	0100010	Hiragana Primary Set	58
35	0100011	Hiragana Supplementary Set	
36	0100100	Chinese Ideographic Set for Chinese Application	55 55(a)-(1)
37	0100101	Chinese Ideographic Set for Japanese Kanji Application	54 54(a)-(h)
38	0100110	2nd Latin Primary Set	3 3(a) 3(b)
39	0100111	2nd Latin Supplementary set	
40	0101000	3rd Latin Primary Set	3 3(a) 3(b)
41	0101001	3rd Latin Supplementary Set	
42	0101010	Cyrillic and Latin Associated Primary sets	36
43	0101011	Tamil Primary Set	37
44	0101100	Tamil Supplementary Set	38
45	0101101	Assamese Primary Set	42
46	0101110	Assamese Supplementary Set	43
47	0101111	Gujerati Primary Set	44
48	0110000	Gujerati Supplementary Set	45
49	0110001	Punjabi Primary Set	46
50	0110010	Punjabi Supplementary Set	47
51	0110011	Telegu Primary Set	48
52	0110100	Telegu Supplementary Set	49
53	0110101	Oriya Primary Set	67
54	0110110	Oriya Supplementary Set	68
55	0110111	4th Latin Primary Set	3 3(a) 3(b)
56	0111000	4th Latin Supplementary Set	
127	1111111	Reserved for other applications	

Figure 14 DESIGNATION OF CHARACTER SETS

					0	1	2	3	4	5	6	7
				b7	0	0	0	0	1	1	1	1
				b5	0	0	1	1	0	0	1	1
				b6	0	1	0	1	0	1	0	1
	b4	b3	b2	b1								
0	0	0	0	0			SP	0	ـة	ذ	–	ى
1	0	0	0	1			!	1	ء	ر	ف	ـعـ
2	0	0	1	0			,,	2	ـب	ز	ق	ـغـ
3	0	0	1	1			£	3	ب	ـس	ك	ـفـ
4	0	1	0	0			$	4	ـت	ـش	ل	ف
5	0	1	0	1			٪	5	ت	ـص	م	ـقـ
6	0	1	1	0			ف	6	ـا	ـض	ن	ق
7	0	1	1	1			ي	7	ا	ط	ه	ك
8	1	0	0	0			)	8	ـب	ظ	و	ـلـ
9	1	0	0	1			(	9	ة	ـع	ى	ل
10	1	0	1	0			*	:	ـت	غ	ـي	ـمـ
11	1	0	1	1			+	؛	ث	ـش	ث	م
12	1	1	0	0			،	>	ج	ـجـ	ج	ـنـ
13	1	1	0	1			–	=	ح	ـحـ	ح	ن
14	1	1	1	0			.	<	خ	ـخـ	خ	لا
15	1	1	1	1			/	؟	د	#	ـيـ	■

Figure 15a ARABIC G0 PRIMARY CHARACTER SET

					0	1	2	3	4	5	6	7
				b7	0	0	0	0	1	1	1	1
				b5	0	0	1	1	0	0	1	1
				b6	0	1	0	1	0	1	0	1
	b4	b3	b2	b1								
0	0	0	0	0				•	à	P	é	p
1	0	0	0	1			ع	١	A	Q	a	q
2	0	0	1	0			آ	٢	B	R	b	r
3	0	0	1	1			أ	٣	C	S	c	s
4	0	1	0	0			ؤ	٤	D	T	d	t
5	0	1	0	1			إ	٥	E	U	e	u
6	0	1	1	0			ئ	٦	F	V	f	v
7	0	1	1	1			ئ	٧	G	W	g	w
8	1	0	0	0			چ	٨	H	X	h	x
9	1	0	0	1			ـچـ	٩	I	Y	i	y
10	1	0	1	0			ج	غ	J	Z	j	z
11	1	0	1	1			ـپـ	غ	K	ë	k	â
12	1	1	0	0			ـپـ	لا	L	ê	l	ô
13	1	1	0	1			پ	ـم	M	ù	m	û
14	1	1	1	0			ژ	ـه	N	î	n	ç
15	1	1	1	1			گ	ه	O	ح	o	

Figure 15b ARABIC G2 SUPPLEMENTARY CHARACTER SET

Figure 16 part 1 DATA FORMAT FOR DRCS DOWNLOADING

1) 12x10x1 20 D-byte Group of a Packet A,B,C,D,E,F,G . . . . . .T One PTU

11 0

	A	B 0	
	C	D	
	E	F	
CHARACTER CODE 'C'	G	H	Dots defined as '1' will be displayed in Foreground Colour
	.	.	
	S	T 9	Dots defined as '0' will be displayed in Background Colour

2) 12x10x2 Two PTU's required for a character

20 D-byte Group of Packet 'N' AO,BO,CO,DO,EO . . . . . .TO One PTU

11 0

	AO	BO 0	
CHARACTER CODE 'C'	CO	DO	
	EO	FO	
	. .	. .	
	SO	TO 9	

Next 20 D-byte Group A1,B1,C1,D1,E1 . . . . . .T1 One PTU

11 0

	A1	B1 0	
	C1	D1	Dots are defined by a bit in Character Code 'C' and an equivalent bit in Character Code 'C+1'
CHARACTER CODE 'C+1'	E1	F1	
	. .	. .	Bit from 'C' specifies least significant bit from DRCS
	S1	T1 9	Colour Look-up Table (DCLUT) and bit from 'C+1' specifies most significant bit from (DCLUT) DRCS Colour Look-Up Table (DCLUT)

3) 6x10x1 as First and Second DRCS

20 D-byte Group of Packet N First DRCS A,X,B,X,C,X,D,X,E,X . . . . . .JX One PTU

11 0

	A	X 0	
	B	X	
	C	X	
CHARACTER CODE 'C'	D	X	Dots defined as '1' will be displayed in
	E	X	Foreground Colour
	.	.	Dots defined as '0' will be displayed in
	J	X 9	Background Colour

Figure 16 part 2

3) continued

20 D-byte Group of Packet N Second DRCS X,A,X,B,X,C,X,D,X,E,X . . . . . .XJ One PTU

11 6	5 0	
X	A 0	
X	B	
CHARACTER CODE 'C' X	C	
X	D	Dots defined as '1' will be displayed in
X	E	Foreground Colour
.	.	Dots defined as '0' will be displayed in
X	J 9	Background Colour

4) 6x5x2 as First and Second DRCS

20 D-byte Group of Packet N First DRCS AO,X,A1,X,BO,X,B1,X . . . . . .X,E1,X One PTU

11 6	5 0	
AO	X 0	
A1	X	Dots are defined by equivalent pair '0' and '1'.
CHARACTER CODE 'C' B0	X	Bit '0' specifies the least significant bit from the DRCS
B1	X	Colour Look-Up Table (DCLUT)
..	.	Bit '1' specified the most significant bit from the DRCS
E1	X 9	Colour Look-up Table (DCLUT)

20 D-byte Group of Packet N Second DRCS X,AO,X,A1,X,BO,X,B1,X . . . . . .X,E1 One PTU

11 6	5 0	
X	A0 0	
X	A1	Dots are defined by equivalent pair '0' and '1'
CHARACTER CODE 'C' X	B0	Bit '0' specifies the least significant bit from the DRCS
X	B1	Colour Look-up Table (DCLUT)
.	..	Bit '1' specifies the most significant bit from the DRCS
X	E1 9	Colour Look-up Table (DCLUT)

Figure 16 part 3

5) 6x10x2 20 D-byte Group of a Packet N A0,A1,B0,B1,C0 . . . . . .JO,J1 One PTU

```
                    11   6  5   0
                     A0      A1   0
                     B0      B1
CHARACTER CODE 'C'   C0      C1
                     ..      ..
                     J0      J1   9
```

Dots are defined by equivalent pair '0' and '1'
Bit '0' specifies the least significant bit from the DRCS Colour Look-up Table (DCLUT)
Bit '1' specifies the most significant bit from the DRCS Colour Look-up Table (DCLUT)

6) 6x10x4 Two PTU's required for a character
20 D-byte Group of Packet 'N' A0,A1,B0,B1,C0 . . . . . .J0,J1 One PTU

```
                    11   6  5   0
                     A0      A1   0
                     B0      B1
CHARACTER CODE 'C'   C0      C1
                     ..      ..
                     J0      J1   9
```

Next 20 D-byte Group A2,A3,B2,B3,C2 . . . . . .J2,J3 One PTU

```
                    11   6  5   0
                     A2      A3   0
                     B2      B3
CHARACTER CODE 'C+1' C2      C3
                     ..      ..
                     J2      J3   9
```

The combination b3,b2,b1,b0 is used as the binary address to colour tables 3 and 4 of the colour map

7) 6x5x4 20 D-byte Group of a Packet N A0,A1,A2,A3,B0,B1,B2,B3 . . . . . .E2,E3 One PTU

```
                    11   6  5   0
                     A0      A1   0
                     A2      A3
                     B0      B1
                     B2      B3
                     ..      ..
                     E2      E3   9
```

The combination b3,b2,b1,b0 is used as the binary address to colour tables 3 and 4 of the colour map

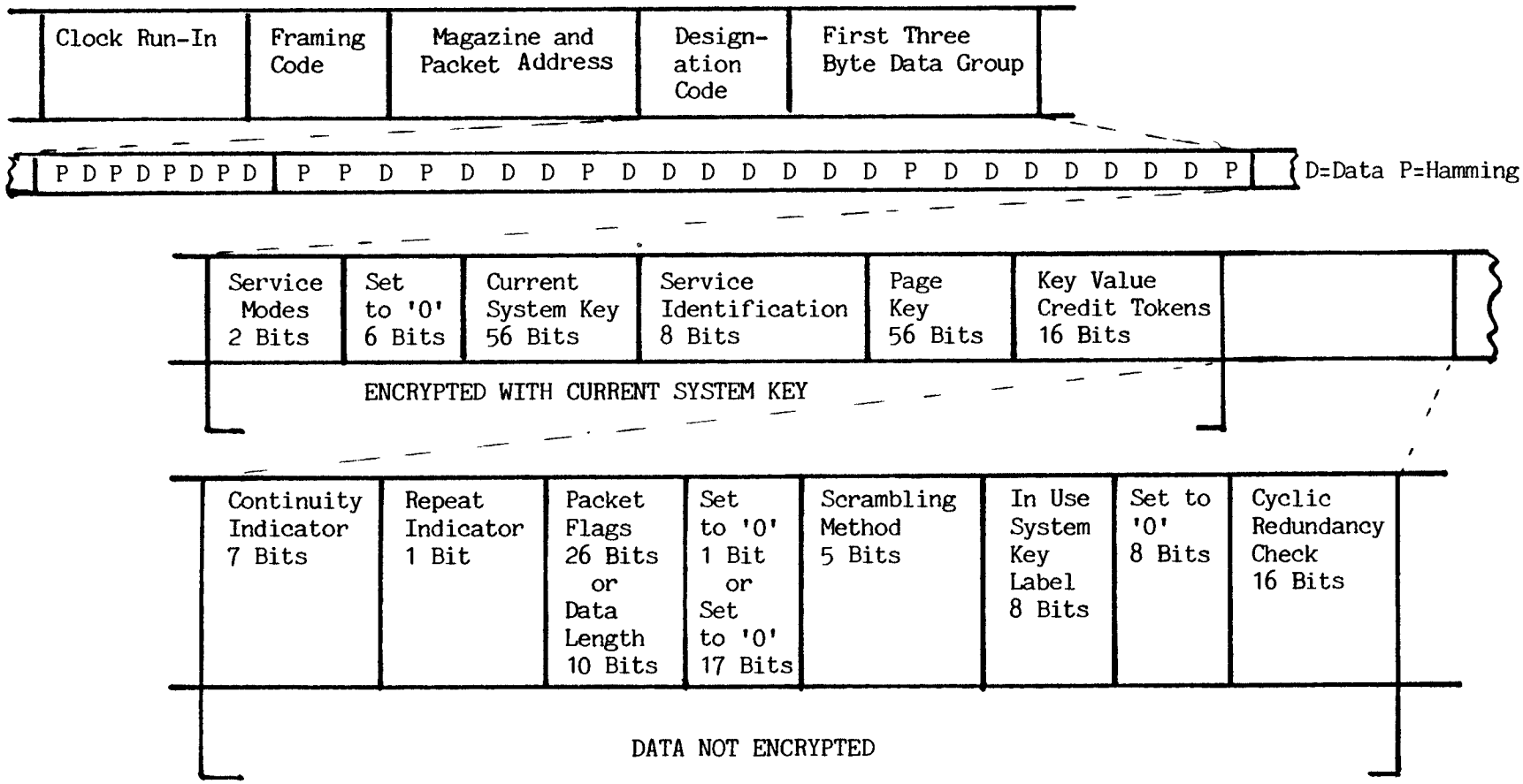


Figure 17(a) FORMAT OF PACKET X/28 OF A SCRAMBLED PAGE

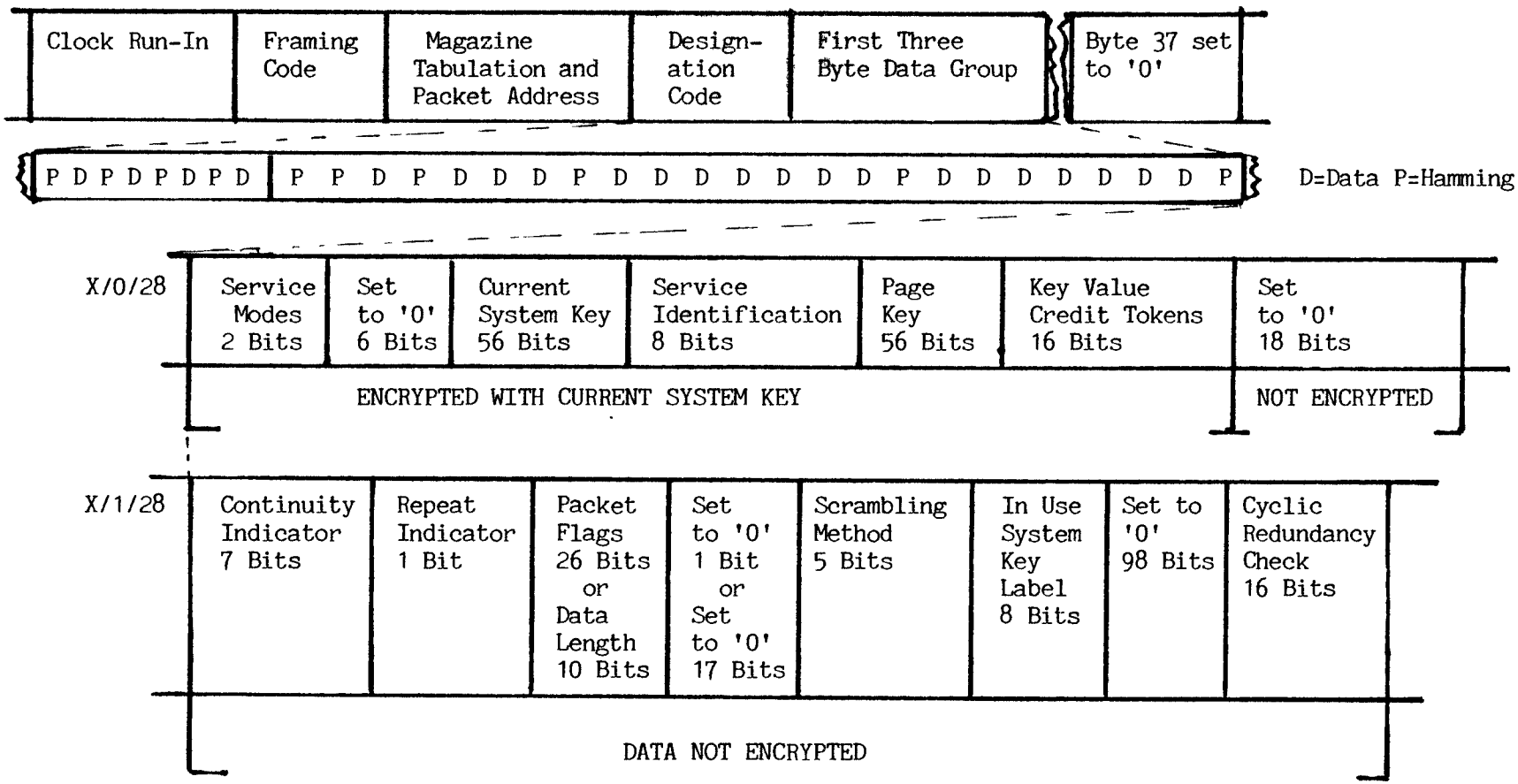


Figure 17(b) FORMAT OF PACKET X/T/28 OF A SCRAMBLED PAGE

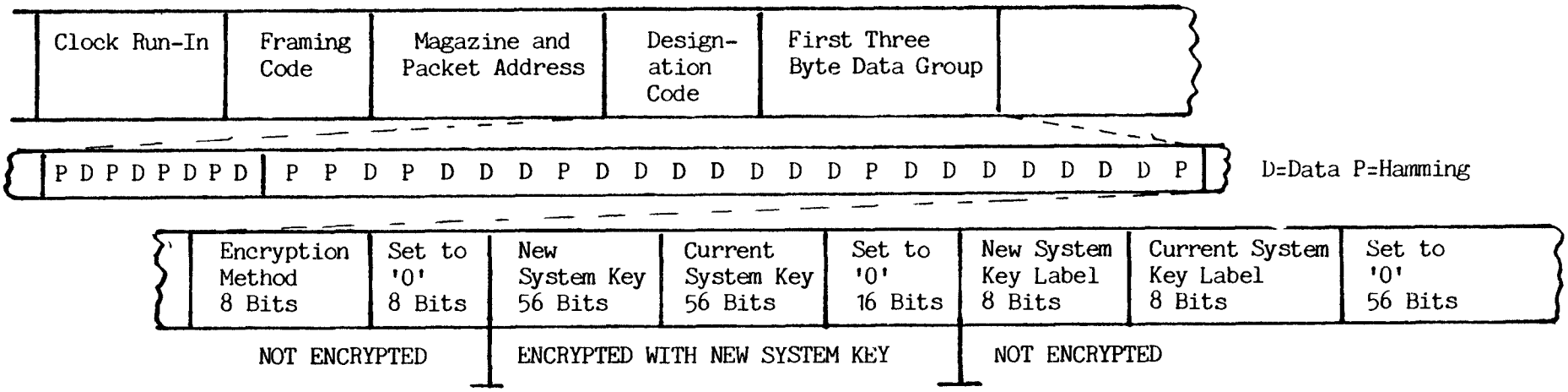


Figure 17(c) PACKET X/28 OF A USER ADDRESSING PAGE

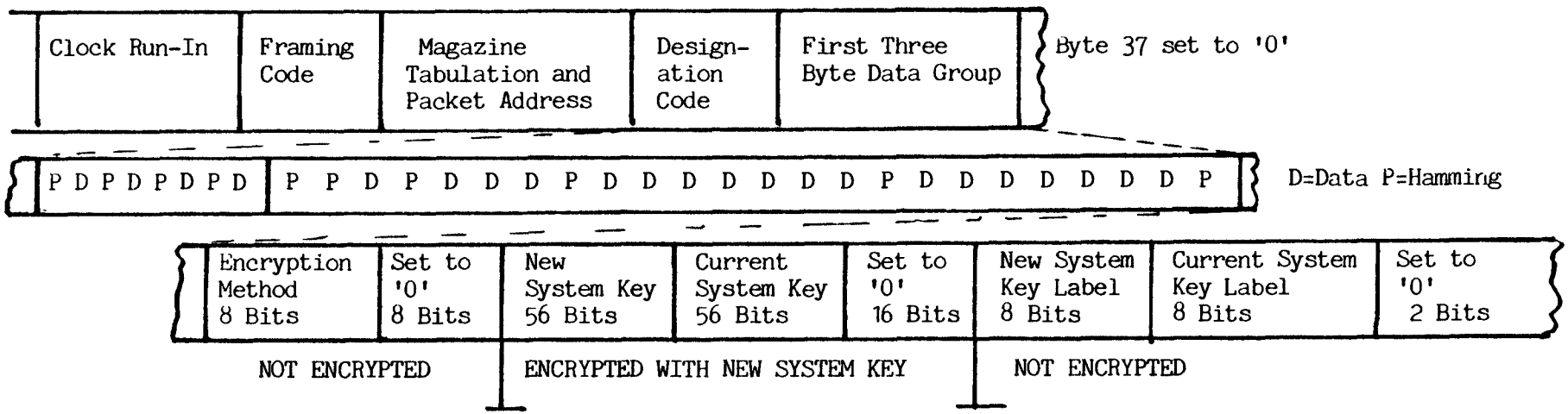


Figure 17(d) PACKET X/0/28 OF A USER ADDRESSING PAGE

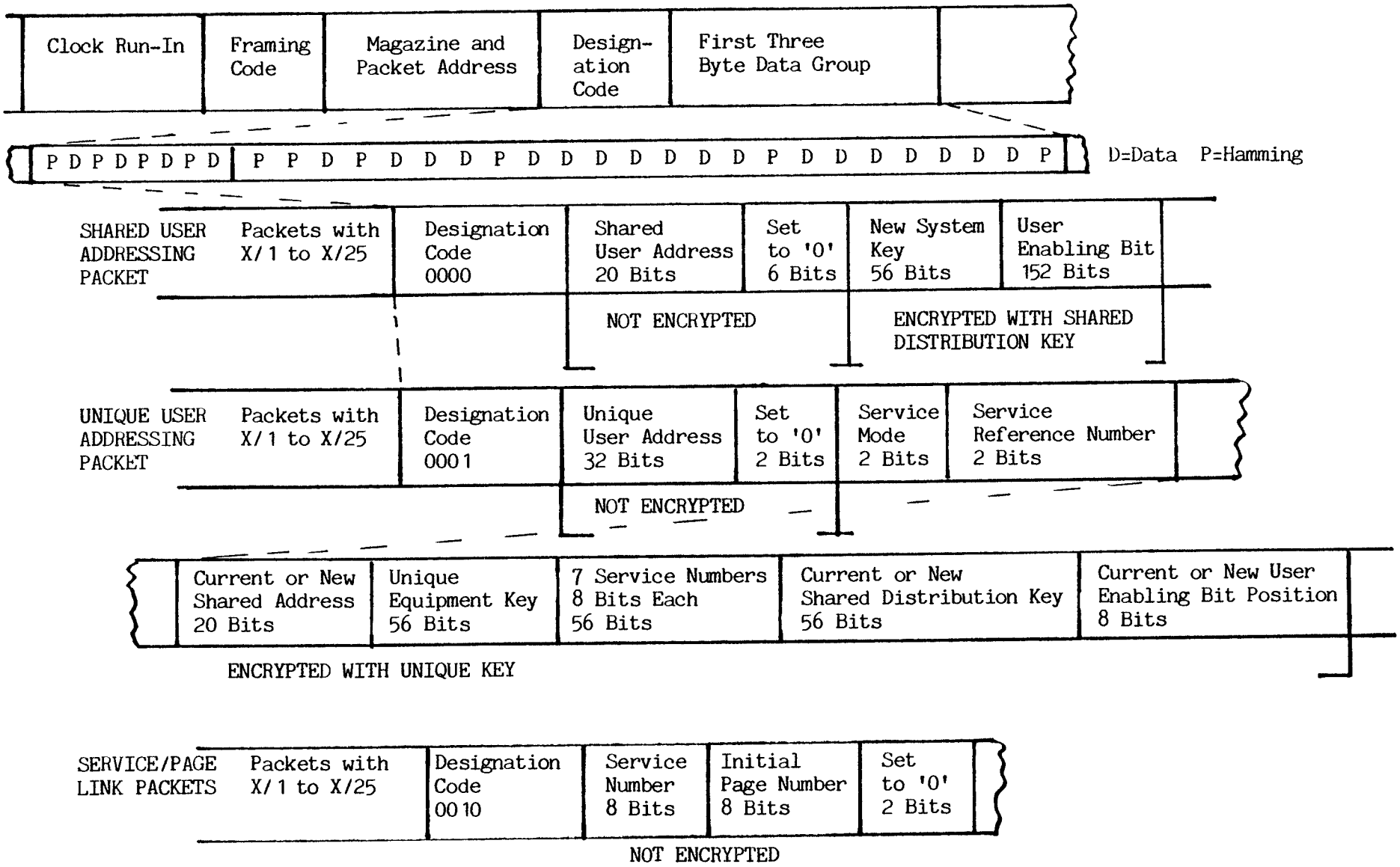


Figure 18(a) USER ADDRESSING PACKETS

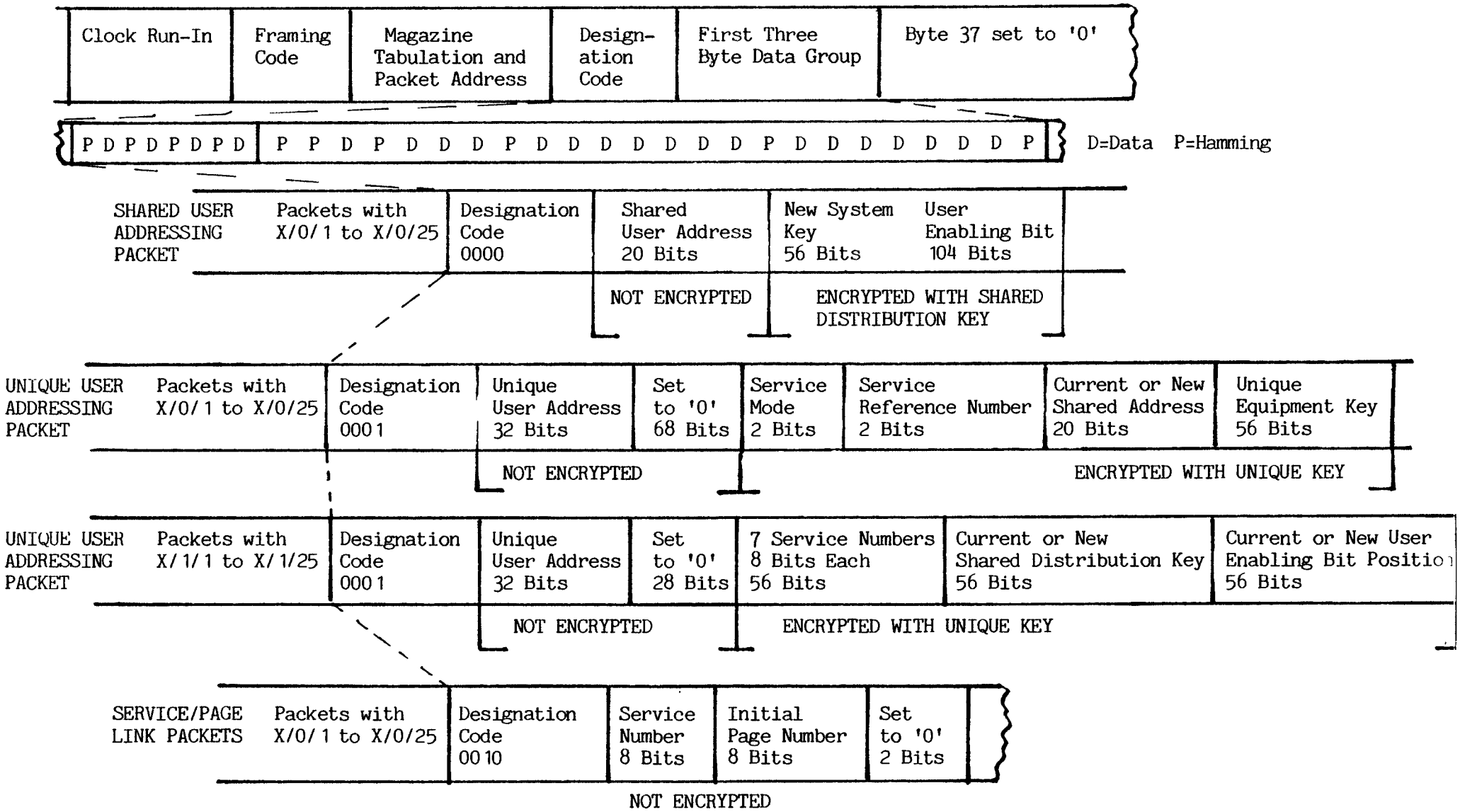


Figure 18(b) USER ADDRESSING PACKETS

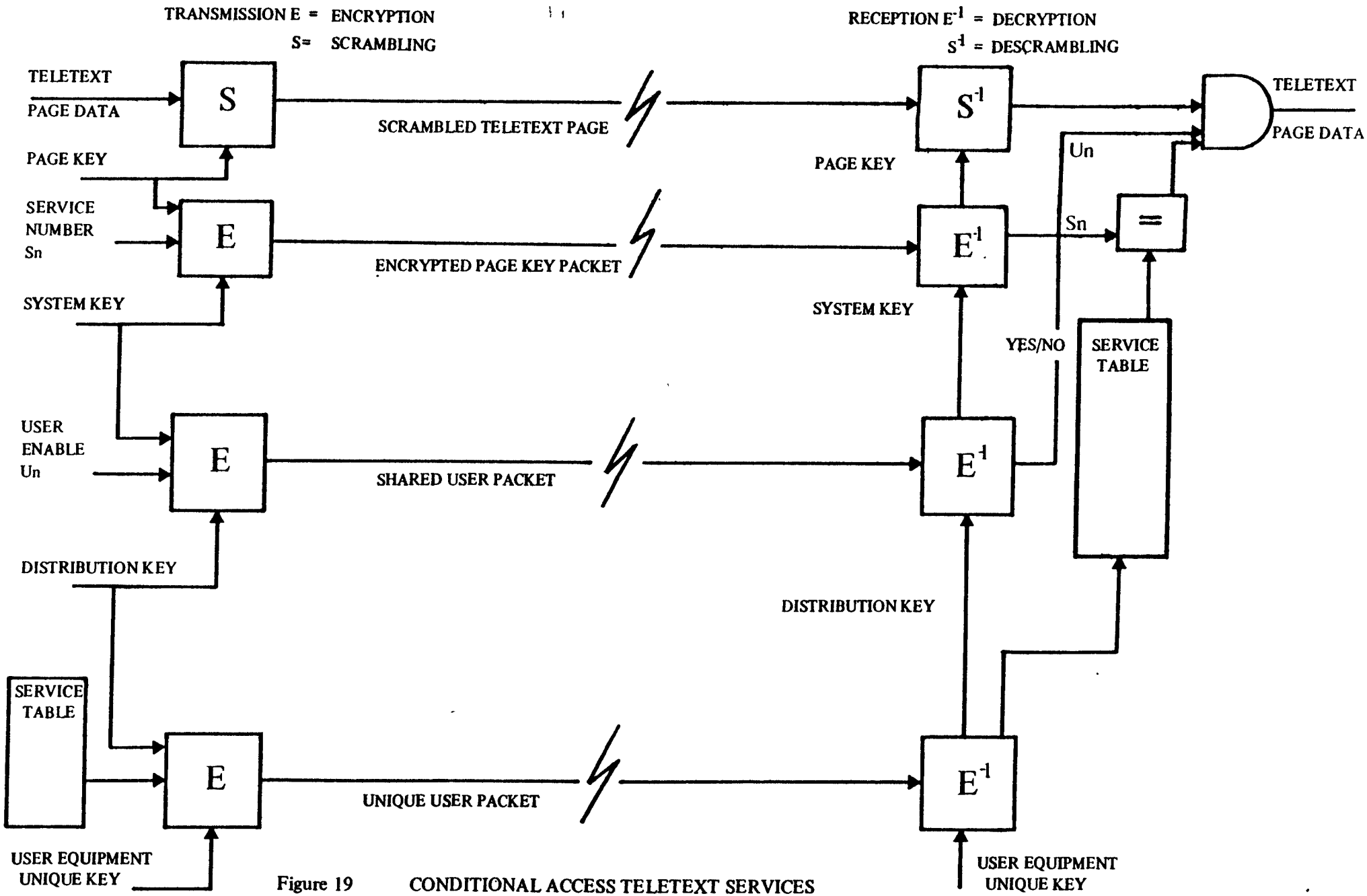


Figure 19 CONDITIONAL ACCESS TELETEXT SERVICES

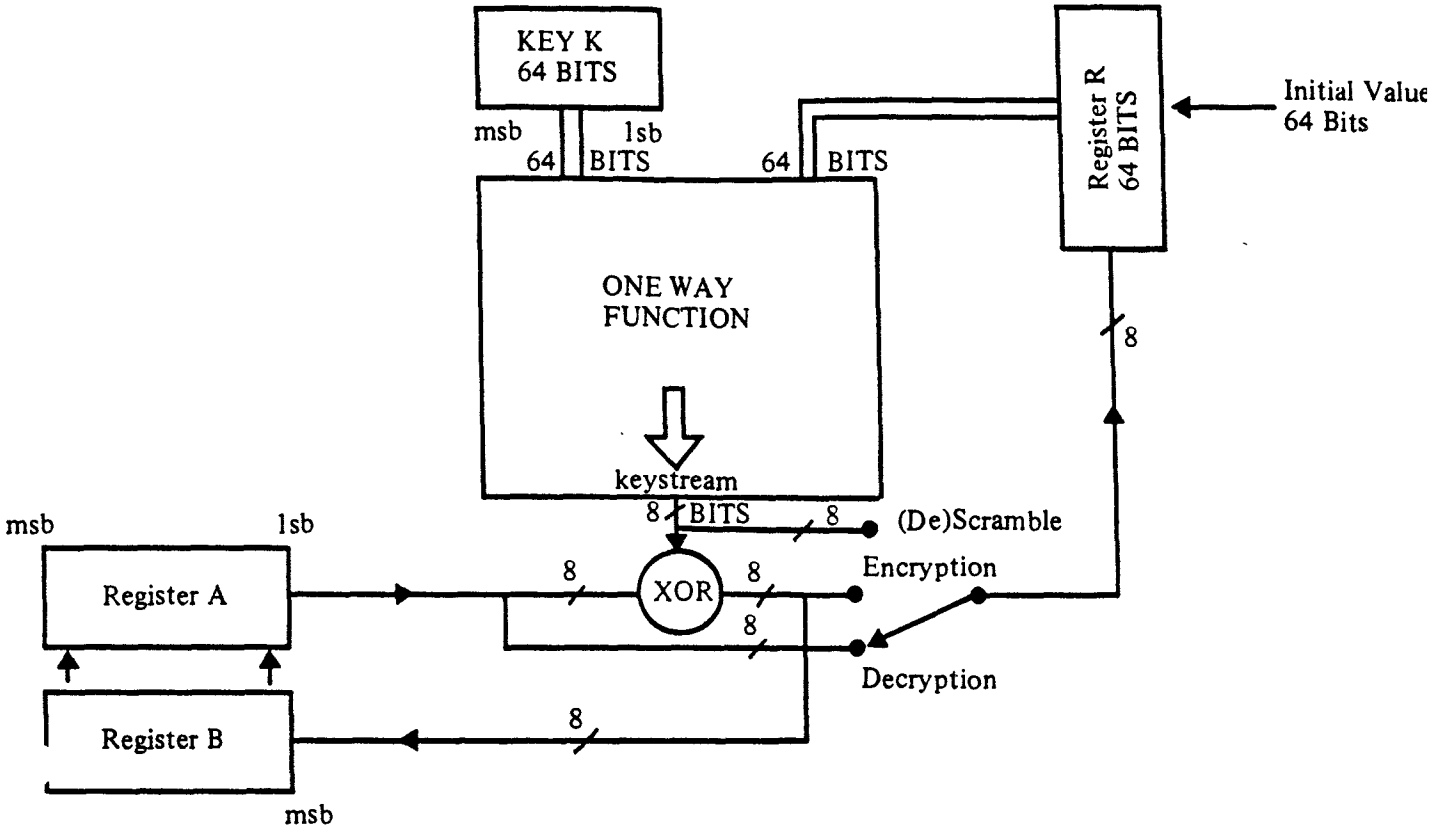


Figure 20 Variable Length Encryption Algorithm

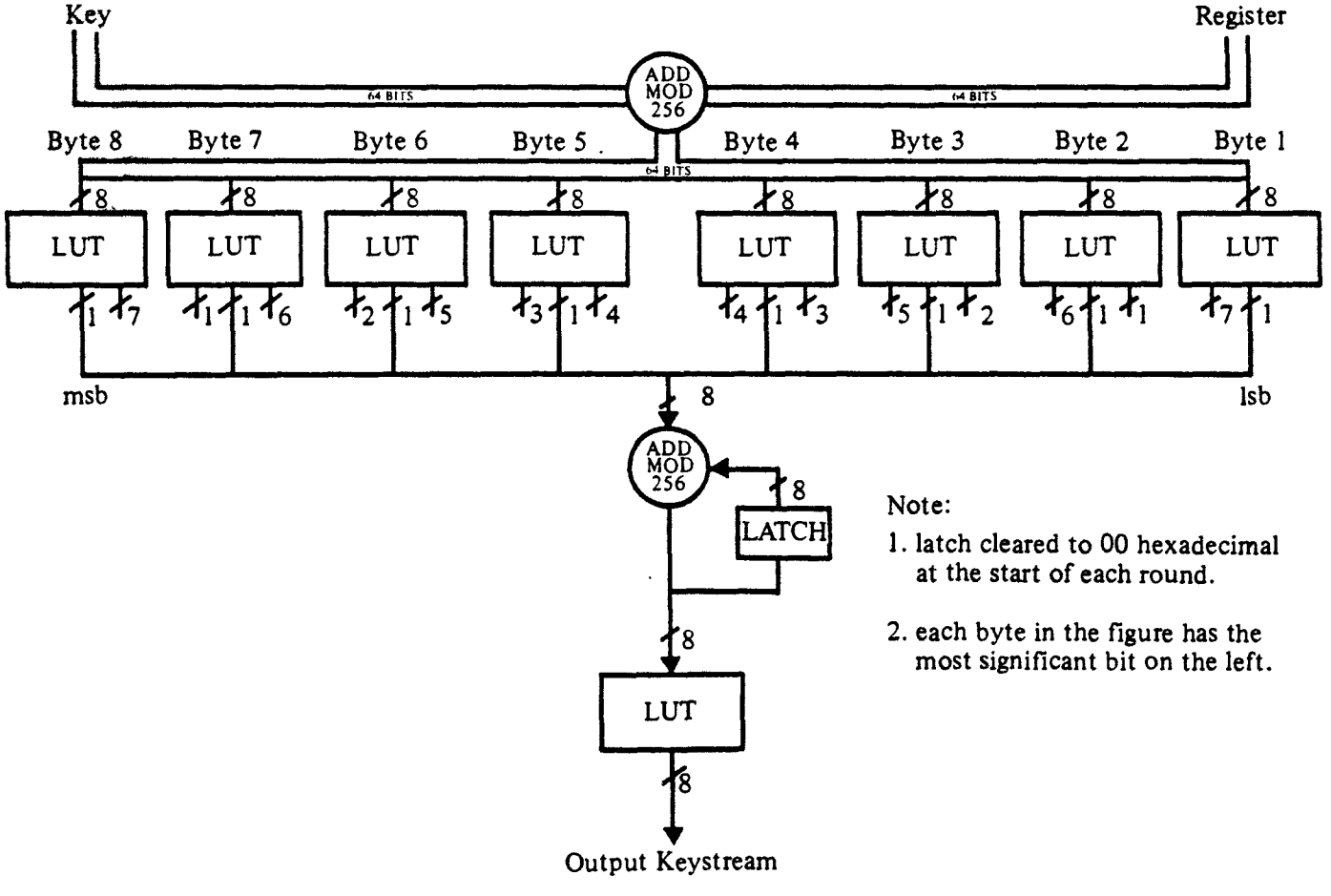


Figure 21 **EXAMPLE OF SUITABLE ONE WAY FUNCTION**

CODE TABLE FOR PROTOCOLS APPLYING TO DATA FOR PROCESSING	
Introductory Sequence	Name
1/11, 7/14	Redefinable Telesoftware Format (RTF)

Figure 22 REGISTER OF INTRODUCTORY SEQUENCES FOR DATA INTENDED FOR PROCESSING

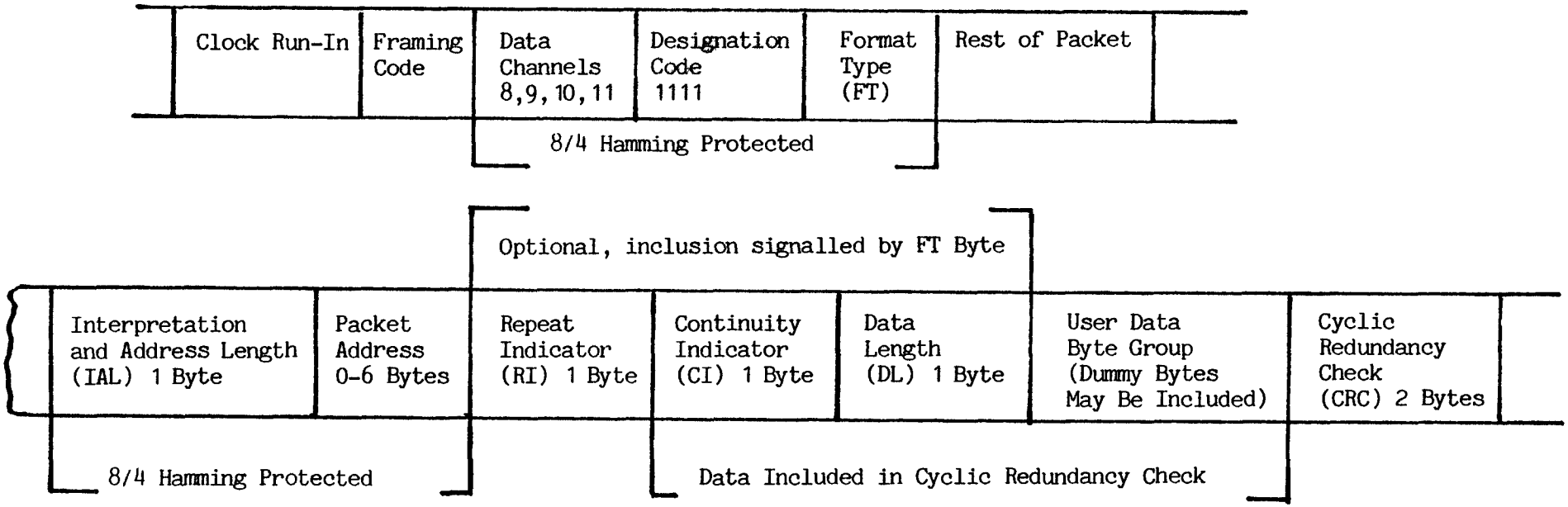


Figure 23 FORMAT OF TYPE 'A' INDEPENDENT DATA LINE

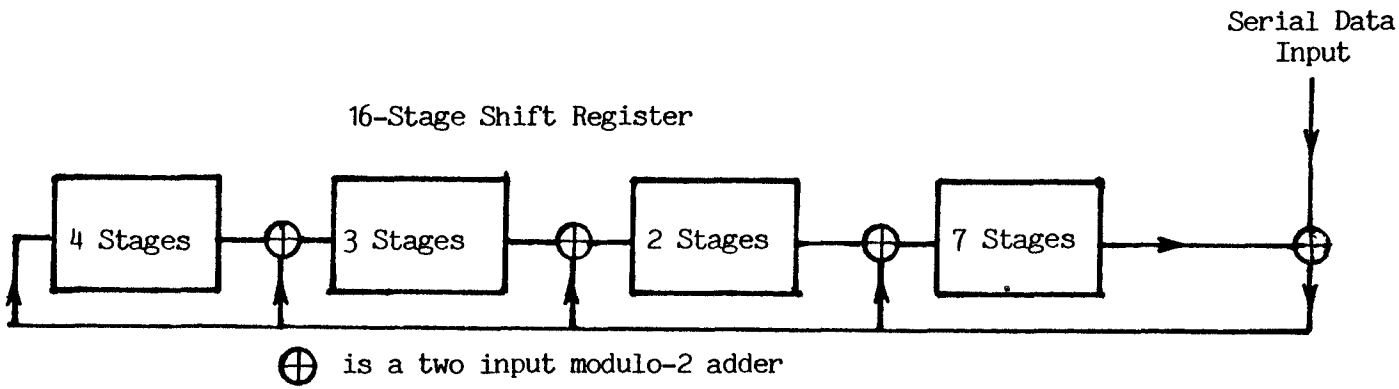


Figure 24 CYCLIC REDUNDANCY CHECK

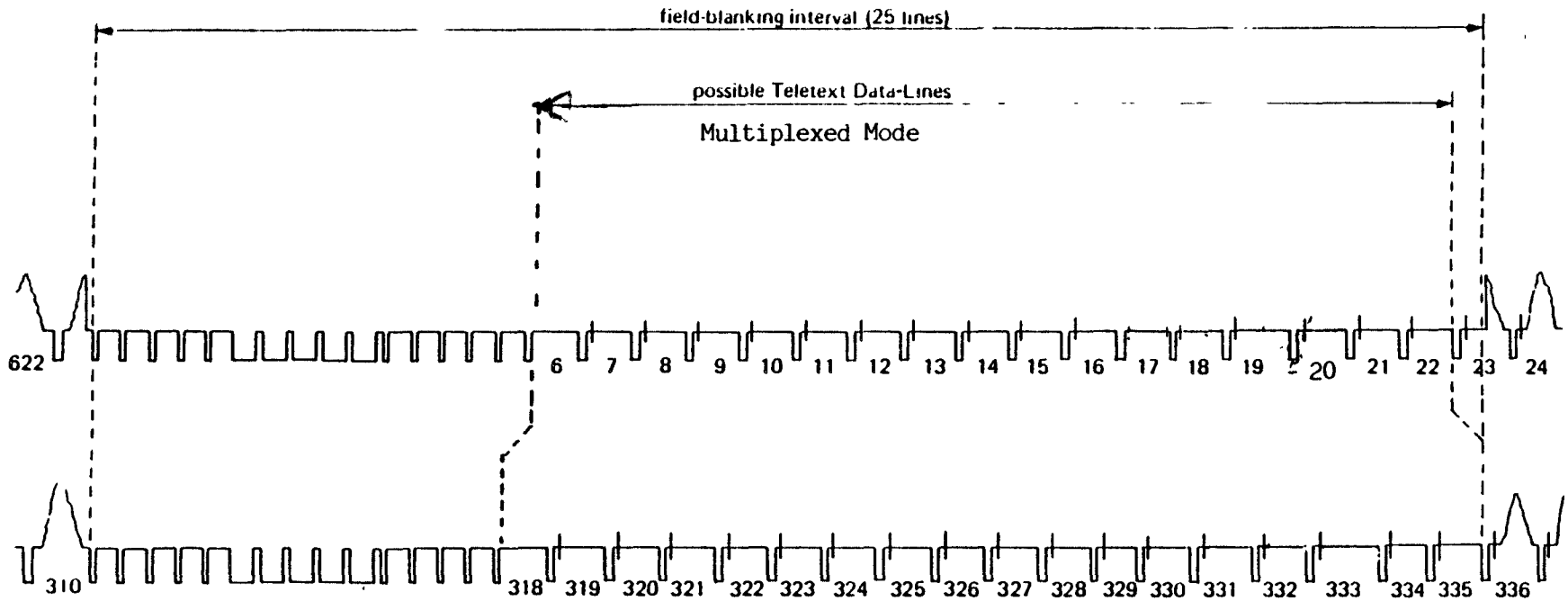


Figure 25(a) TELEVISION SIGNAL LINE NUMBERS 625 LINE SYSTEMS

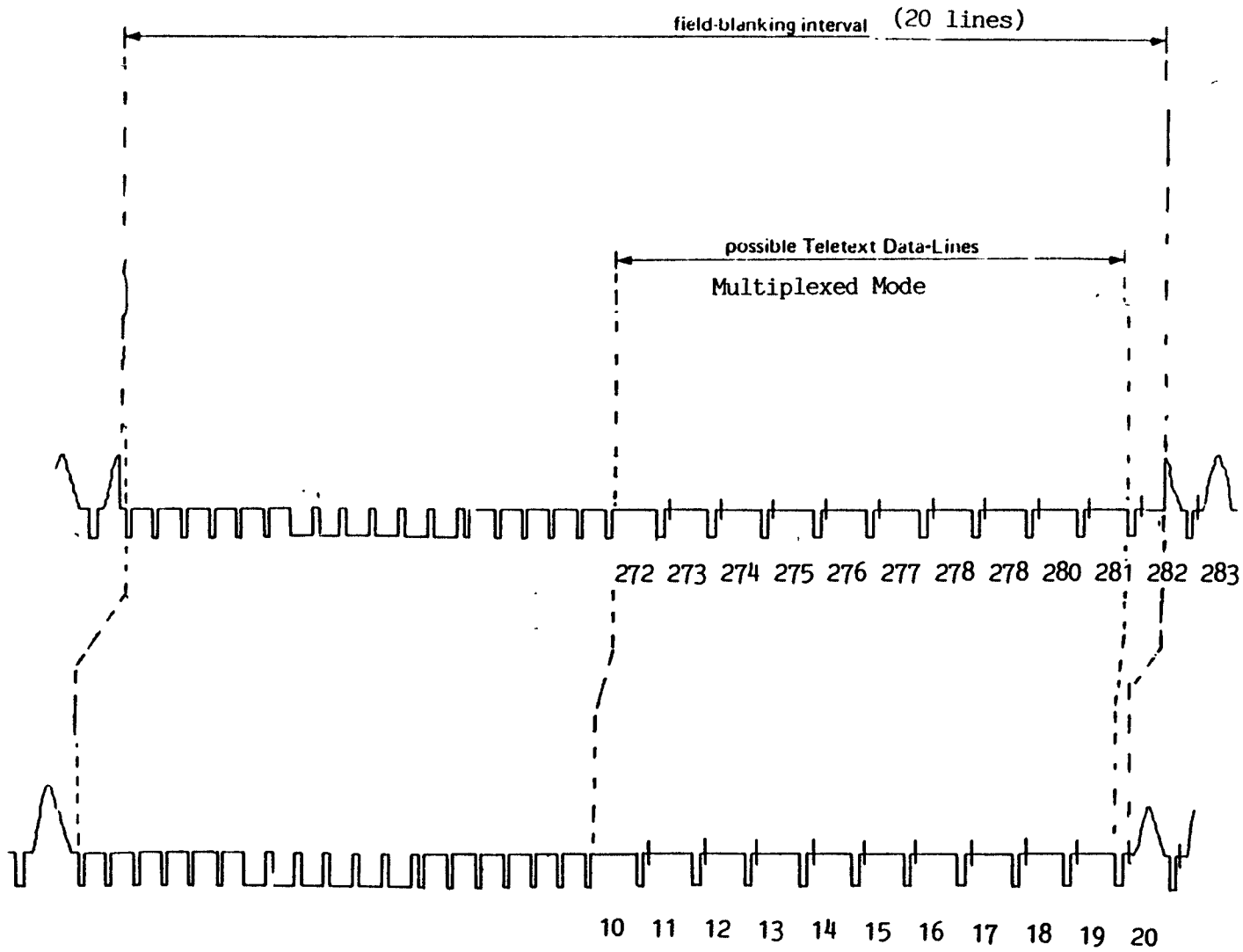


Figure 25(b) TELEVISION SIGNAL LINE NUMBERS 525 LINE SYSTEMS

CODE TABLE FOR ENCRYPTION METHODS

Method Number	Bits 1 to 8 in Transmission Order	Name of Encryption Method
1	00000000	Variable Length Algorithm Using a One Way Function (see figures 20 and 21)
2	10000000	Block Encipherment Alorithm Using Differential Code Book or Ouput Feedback (see note below and figure 40)
	11111111	Method Not Specified

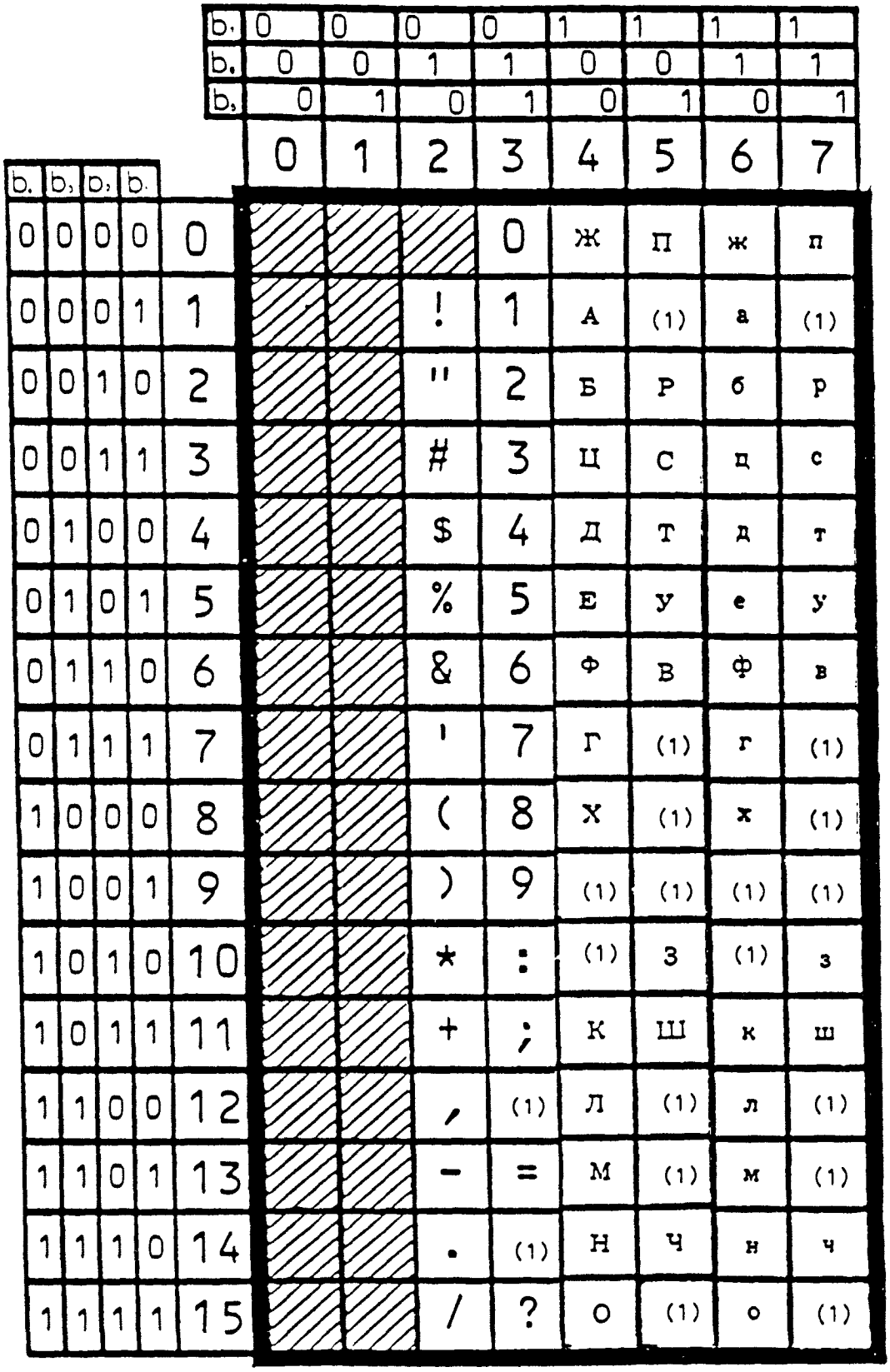
Figure 26 REGISTER OF ENCRYPTION METHODS

CODE TABLE FOR SCRAMBLING METHODS

Method Number	Bits 1 to 5 in Transmission Order	Name of Scrambling Method
1	00000	Variable Length Algorithm Using a One Way Function Method A (see figures 20 and 21)
2	10000	Block Encipherment Alorithm Using Ouput Feedback
3	01000	Variable Length Algorithm Using a One Way Function Method B (see figures 69 and 70)
4	11000	MAC Scrambler (see figures 71 and 72)
	11111	Method Not Specified

Figure 26(a) REGISTER OF SCRAMBLING METHODS

Note: Differential Code Book
The first 8 bytes of conversion use the Electronic Code Book of ISO DIS 8372. For subsequent 8-byte blocks, the input data at decipherment is first 'exclusive ORed' with the result of the previous conversion and then converted using the Electronic Code Book.



b_4	b_3	b_2	b_1		0	1	2	3	4	5	6	7
					0	0	0	0	1	1	1	1
					0	0	1	1	0	0	1	1
					0	1	0	1	0	1	0	1
0	0	0	0	0				0	Ж	П	ж	п
0	0	0	1	1			!	1	А	(1)	а	(1)
0	0	1	0	2			"	2	Б	Р	б	р
0	0	1	1	3			#	3	Ц	С	ц	с
0	1	0	0	4			$	4	Д	Т	д	т
0	1	0	1	5			%	5	Е	У	е	у
0	1	1	0	6			&	6	Ф	В	ф	в
0	1	1	1	7			'	7	Г	(1)	г	(1)
1	0	0	0	8			(	8	Х	(1)	х	(1)
1	0	0	1	9			)	9	(1)	(1)	(1)	(1)
1	0	1	0	10			*	:	(1)	З	(1)	з
1	0	1	1	11			+	;	К	Ш	к	ш
1	1	0	0	12			,	(1)	Л	(1)	л	(1)
1	1	0	1	13			-	=	М	(1)	м	(1)
1	1	1	0	14			.	(1)	Н	Ч	н	ч
1	1	1	1	15			/	?	О	(1)	о	(1)

Figure 27

PRIMARY CHARACTER SET - CYRILLIC ALPHABET
COMMON CHARACTERS GO CODE TABLE

(1) National Variations
see figure 27(a)

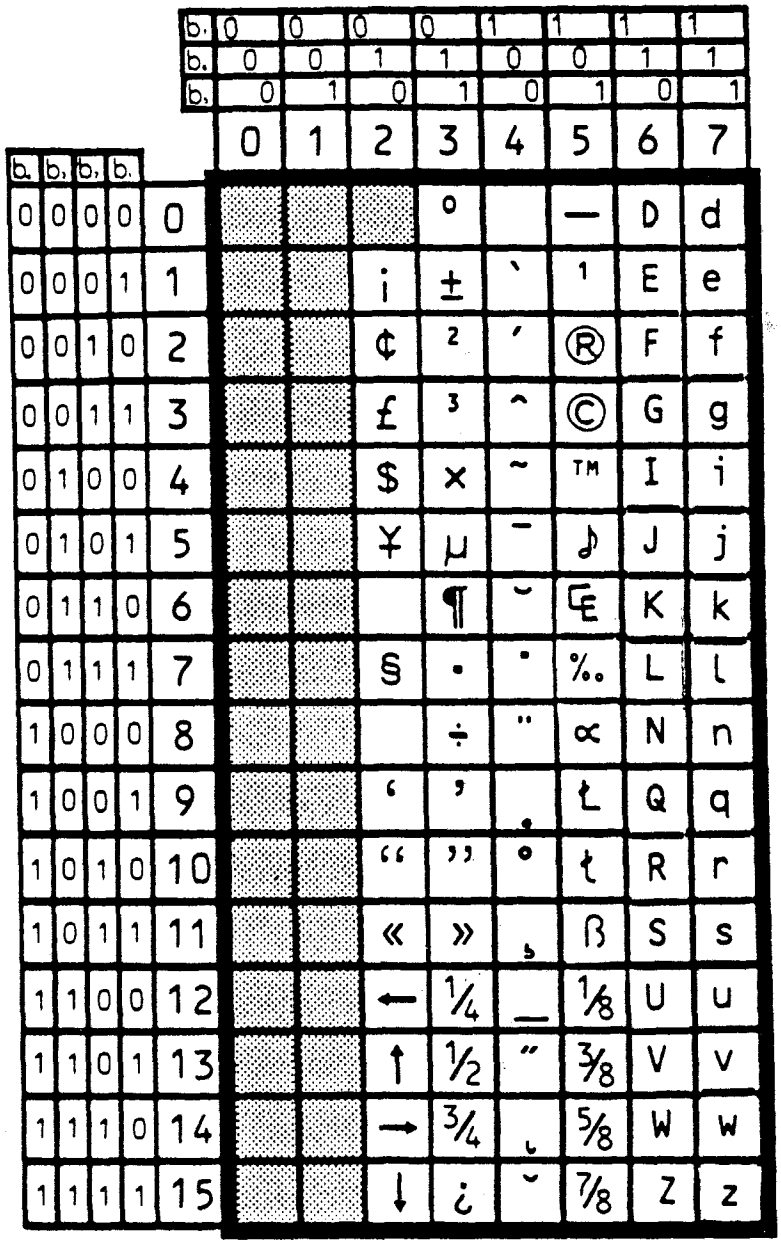


Figure 27(a) Cyrillic Supplementary G2 Set

Column 4 contains diacritical marks for association with another character addressed to the same presentation position.
The Character in position 2/0 is to be interpreted as SPACE.
The Character in position 5/6 represents the European Currency Symbol.

Blank positions are 'transparent' permitting the display of any character otherwise overwritten.

CODE TABLE POSITION	SERBOCROAT (Option 1)	MACEDONIAN (Option 2)	RUTHENIAN BULGARIAN (Option 3)	RUSSIAN (Option 4)	UKRANIAN (Option 5)	BYELORUSSIAN (Option 6)
3/12	<	<	Ґ	Ё	<	Е
3/14	>	>	ґ	ё	>	е
4/9	и					і
4/10	Ј	Ј	и	и	и	и
5/1	Љ	Љ	ю	я	я	я
5/7	Њ	Њ	Є	ю	ю	ю
5/8	Ц	Ц	Ї	ы	Ї	ы
5/9	Ѕ	Ѕ	я	ь	ь	ь
5/12	Ћ	Ѓ	ь	э	Є	э
5/13	Ќ	Ќ	ш	щ	ш	щ
5/15	—	—	Ъ	ъ	і	ъ
6/9	в					Ў
6/10	ј	ј	й	й	й	й
7/1	љ	љ	ю	я	я	я
7/7	њ	њ	є	ю	ю	ю
7/8	ц	ц	ї	ы	ї	ы
7/9	ѕ	ѕ	я	ь	ь	ь
7/12	ћ	ѓ	ь	э	є	э
7/13	ќ	ќ	щ	щ	щ	щ
7/15	■	■	ъ	ъ	і	ъ

Figure 27(b) PRIMARY CHARACTER SET - CRYILLIC ALPHABET NATIONAL OPTION VARIATIONS Indicated (1) in Cyrillic Alphabet Code Table of figure 27

Note The Byelorussian characters Y and y are coded using the respective codes 5/5 and 7/5 from the primary set of figure 27 plus the diacritical mark character 4/6 from the supplementary set of figure 27(a).

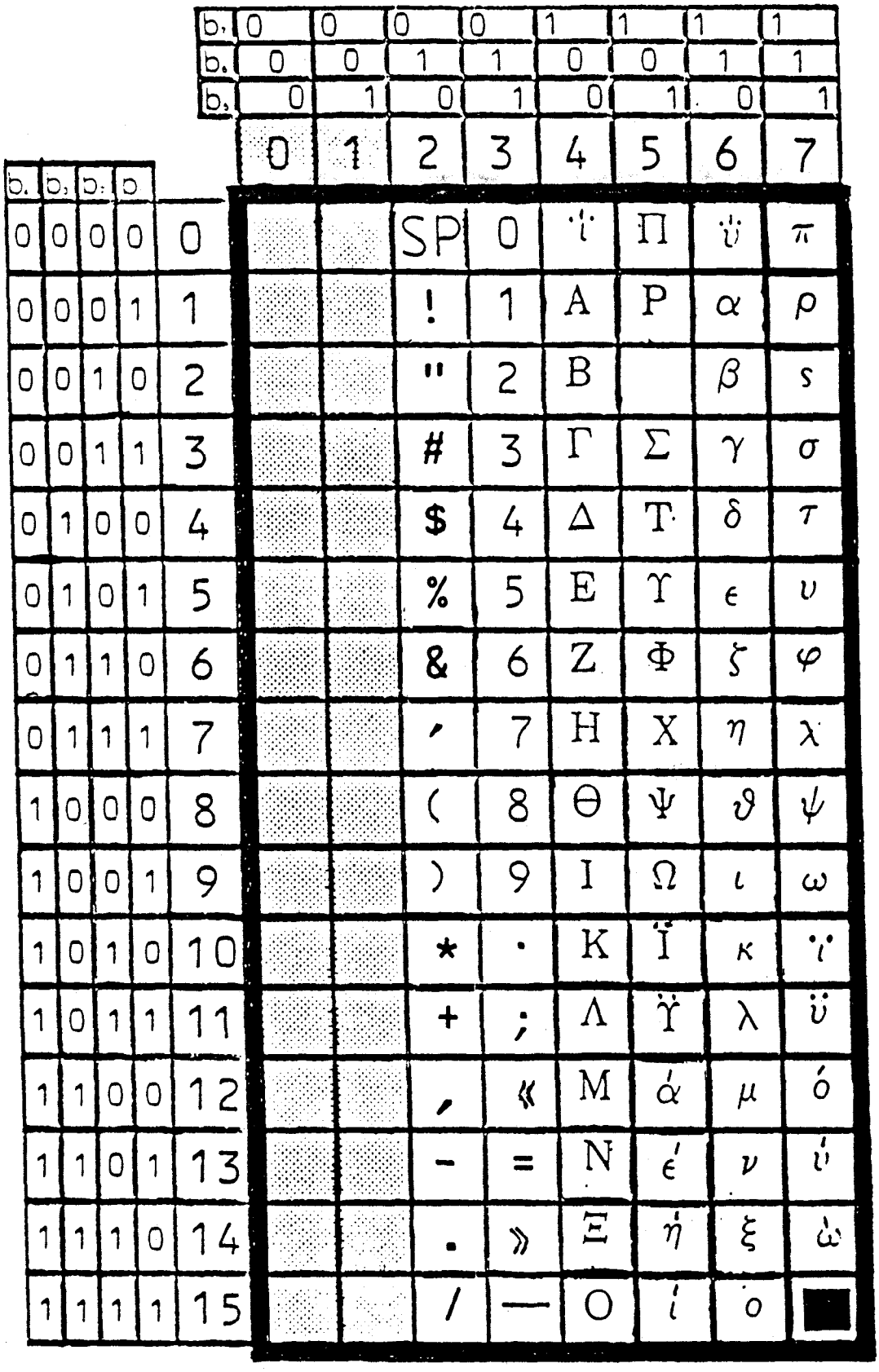
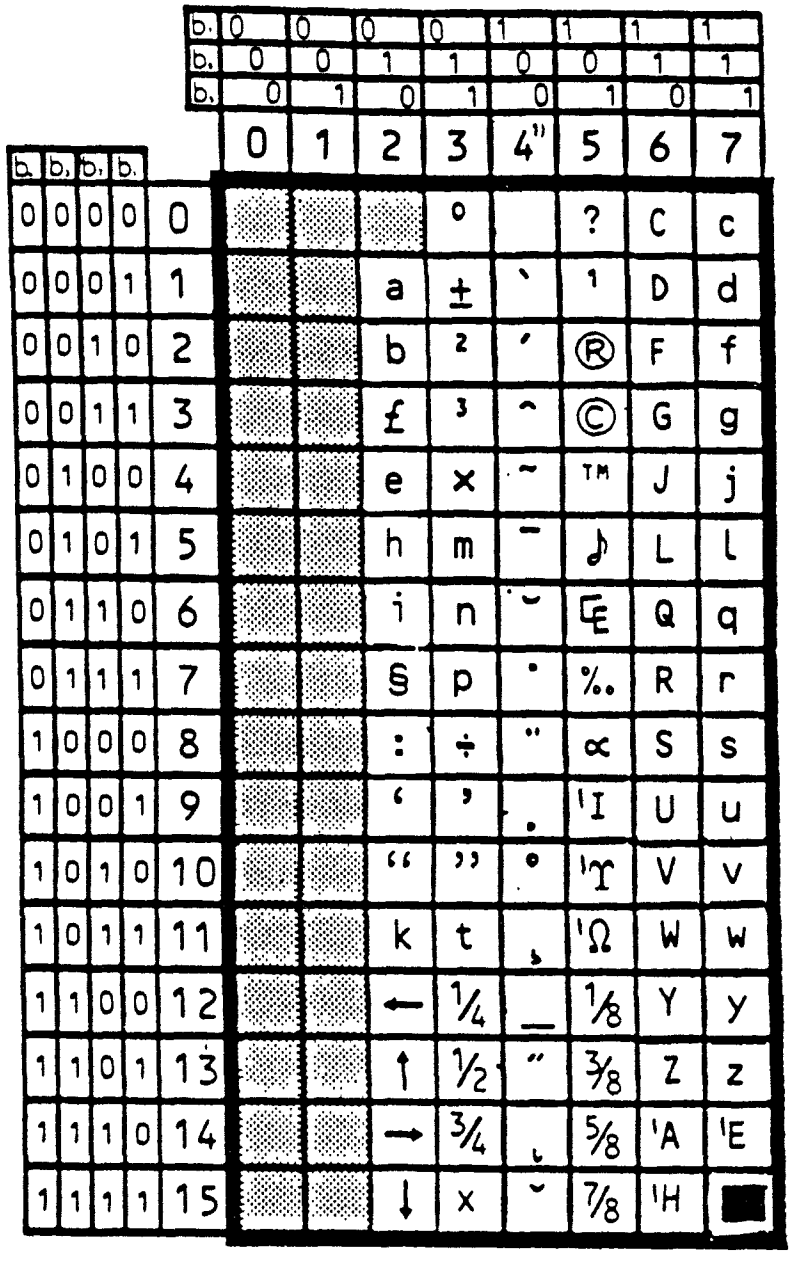


Figure 28 GREEK PRIMARY G0 SET



b4	b3	b2	b1		0	1	2	3	4	5	6	7
				b8	0	0	0	0	1	1	1	1
				b7	0	0	1	1	0	0	1	1
				b6	0	1	0	1	0	1	0	1
0	0	0	0	0				°		?	C	c
0	0	0	1	1			a	±	`	¹	D	d
0	0	1	0	2			b	²	´	®	F	f
0	0	1	1	3			£	³	^	©	G	g
0	1	0	0	4			e	×	~	™	J	j
0	1	0	1	5			h	m	¯	♪	L	l
0	1	1	0	6			i	n	¨	₠	Q	q
0	1	1	1	7			§	p	·	‰	R	r
1	0	0	0	8			:	÷	¸	∝	S	s
1	0	0	1	9			‘	’	.	¹I	U	u
1	0	1	0	10			“	”	°	¹Υ	V	v
1	0	1	1	11			k	t	¸	¹Ω	W	w
1	1	0	0	12			←	¼	_	⅛	Y	y
1	1	0	1	13			↑	½	˝	⅜	Z	z
1	1	1	0	14			→	¾	˛	⅝	¹A	¹E
1	1	1	1	15			↓	x	ˇ	⅞	¹H	■

Figure 28(a) Greek Supplementary G2 Set

Column 4 Contains diacritical marks for association with another character addressed to the same presentation position.
The Character in position 2/0 is to be interpreted as SPACE.
The Character in position 5/6 represents the European Currency Symbol.

Blank positions are 'transparent' permitting the display of any character otherwise overwritten.

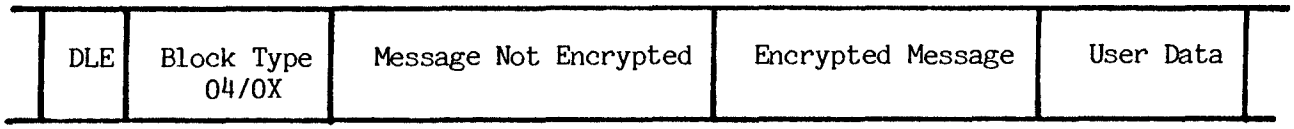


Figure 29(a) GENERAL FORM OF DATA BLOCK

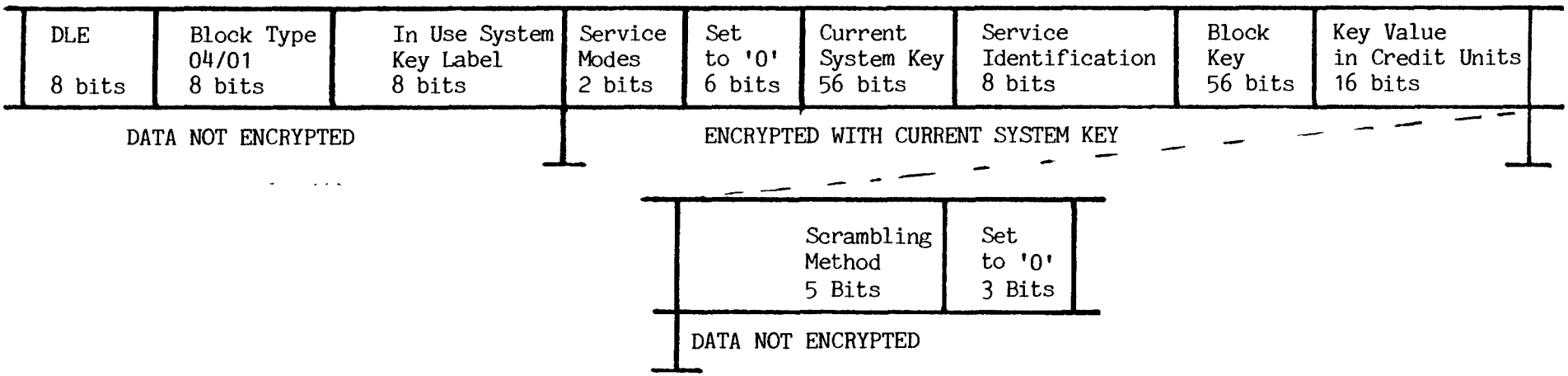


Figure 29(b) PRIMARY BLOCK KEY MESSAGES

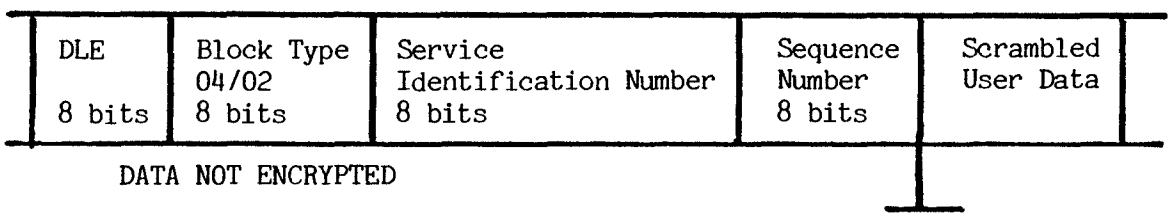


Figure 29(c) SECONDARY BLOCK MESSAGES AND SCRAMBLED USER DATA

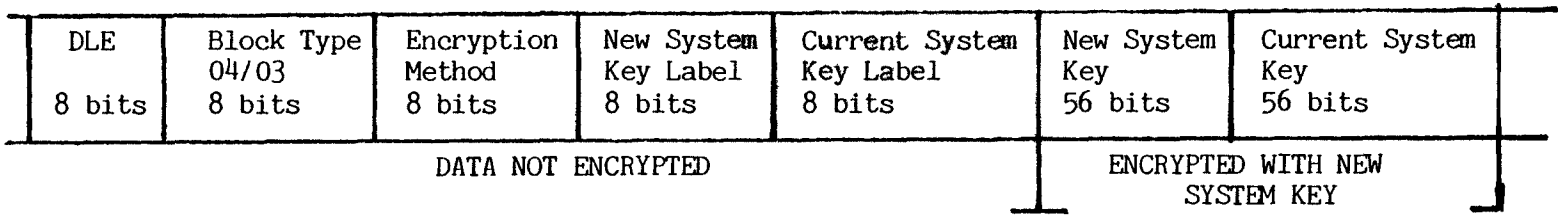


FIGURE 29(d) SYSTEM KEY BLOCK MESSAGES

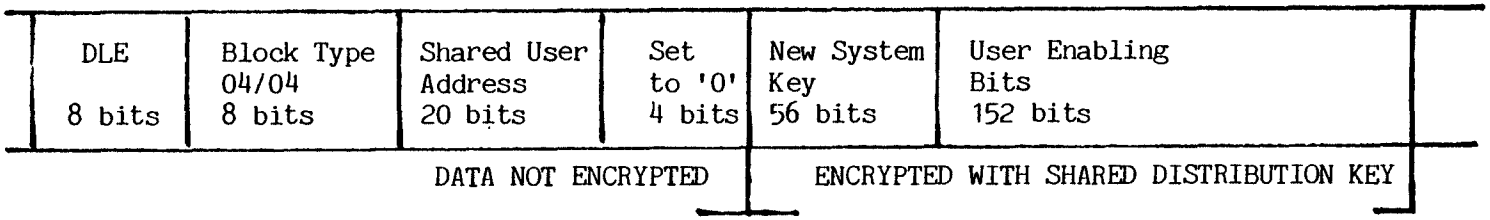


Figure 29(e) SHARED USER MESSAGE BLOCK

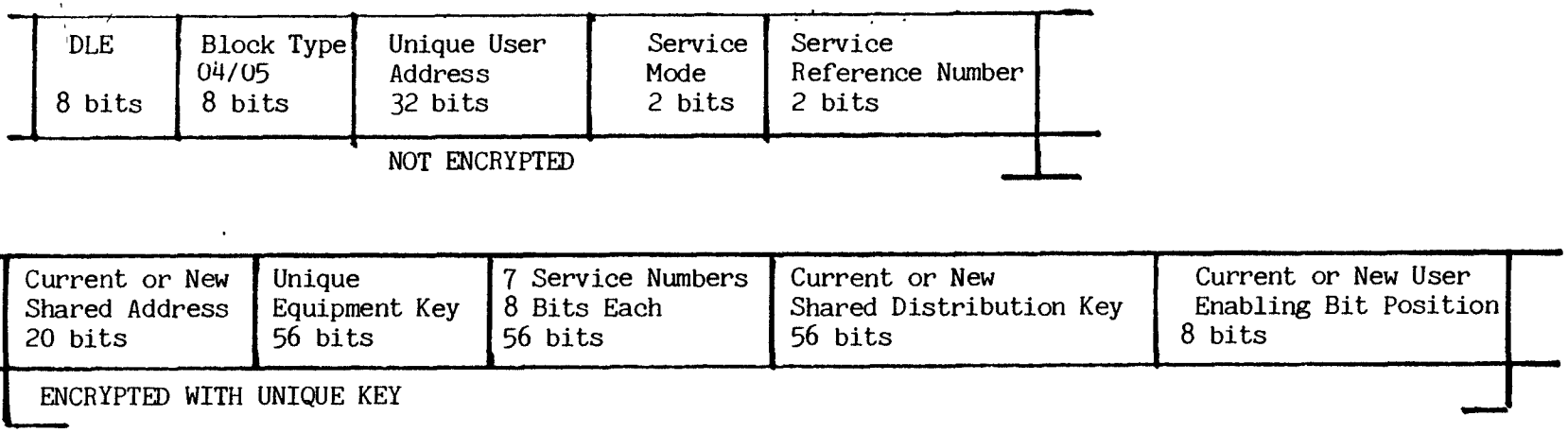


Figure 29(f) UNIQUE USER BLOCK

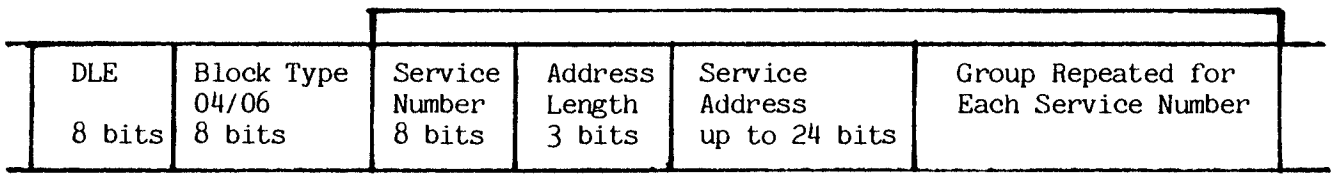


Figure 29(g) SERVICE ADDRESS BLOCK INDEPENDENT DATA SERVICES

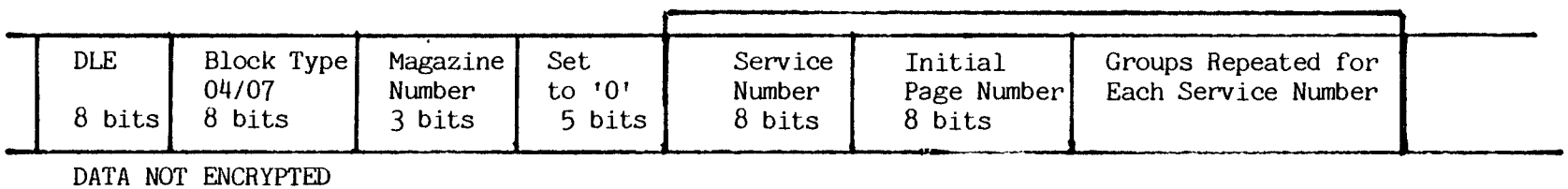


Figure 29(h) SERVICE ADDRESS BLOCK PAGE FORMAT SERVICES

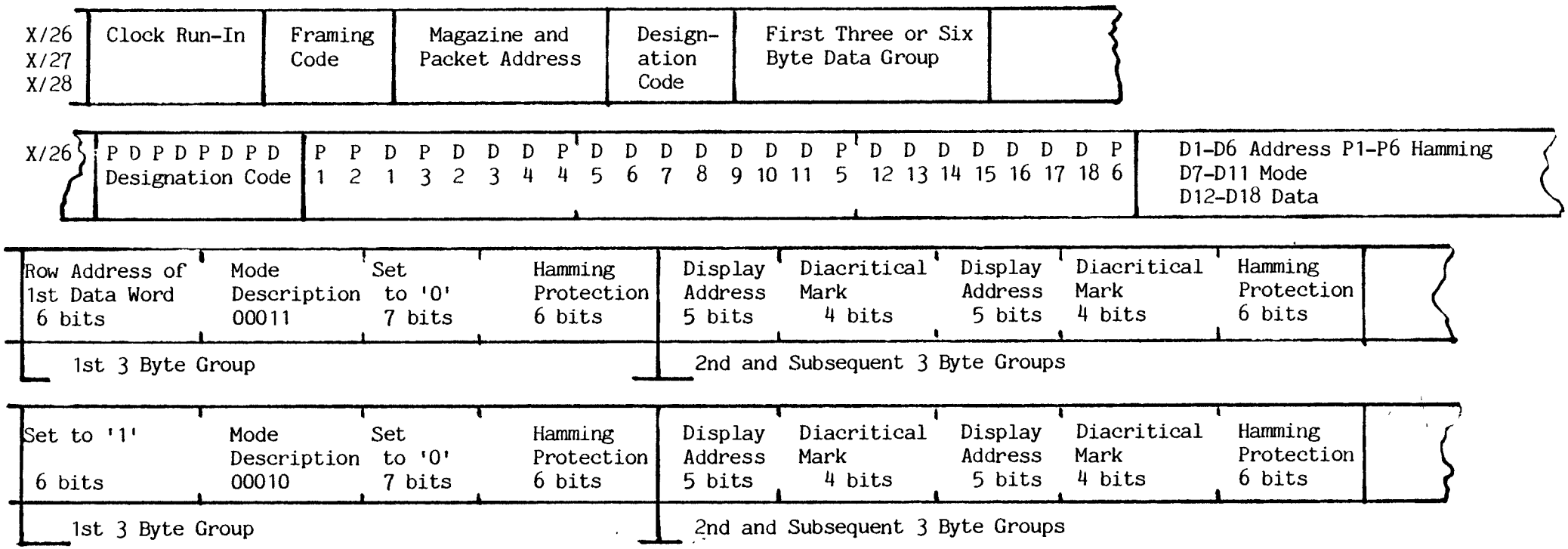


Figure 30(a) PACKET 26 FORMAT FOR SANSCRIT DERIVED LANGUAGES

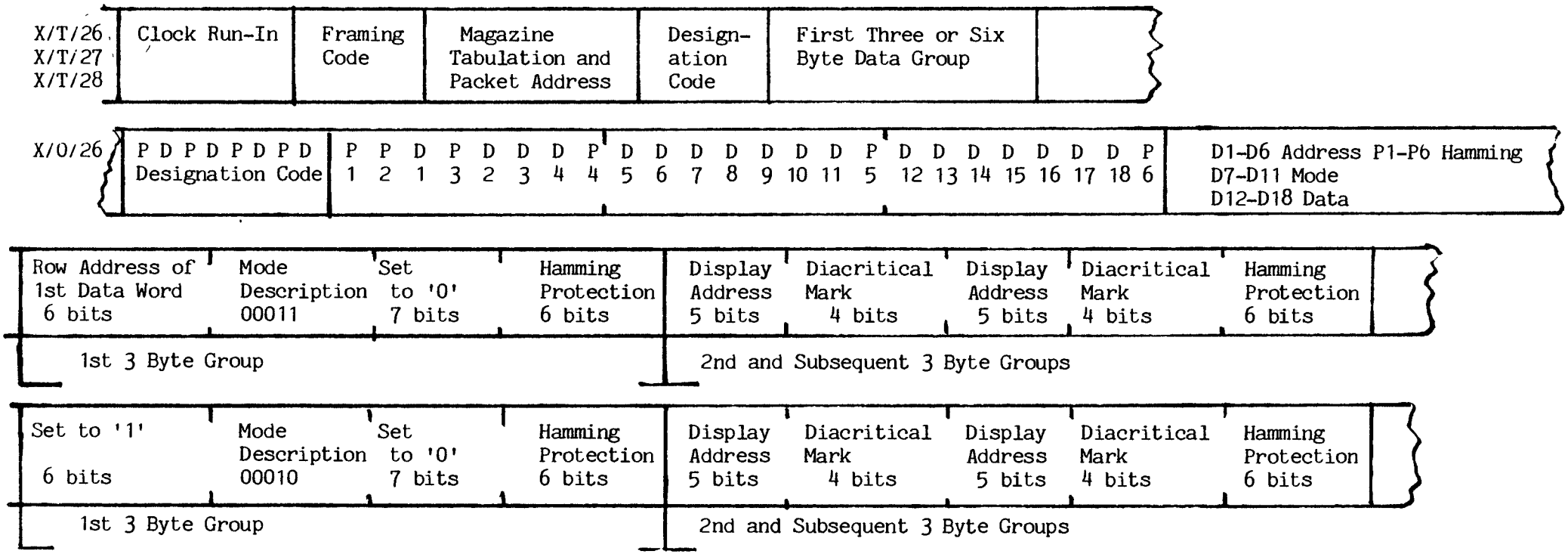


Figure 30(b) PACKET 26 FORMAT FOR SANSCRIT DERIVED LANGUAGES

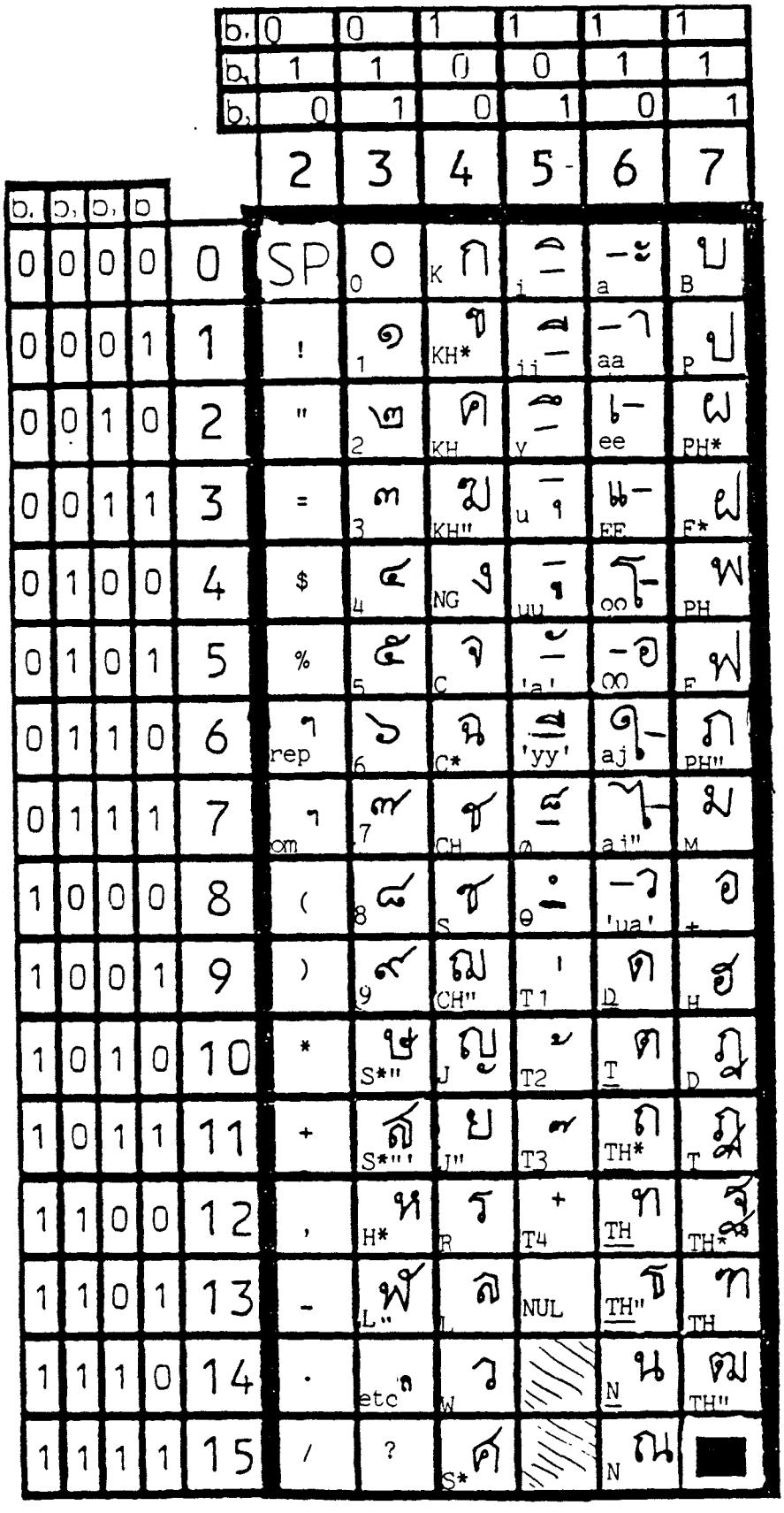


Figure 31 THAI GO PRIMARY CHARACTER SET

Column 5 characters are non-spacing when transmitted in a packet with Y=26

The Character in position 7/15 occupies an area equivalent to that of any character that does not include a descender. It is thus a rectangle surrounded by the background colour

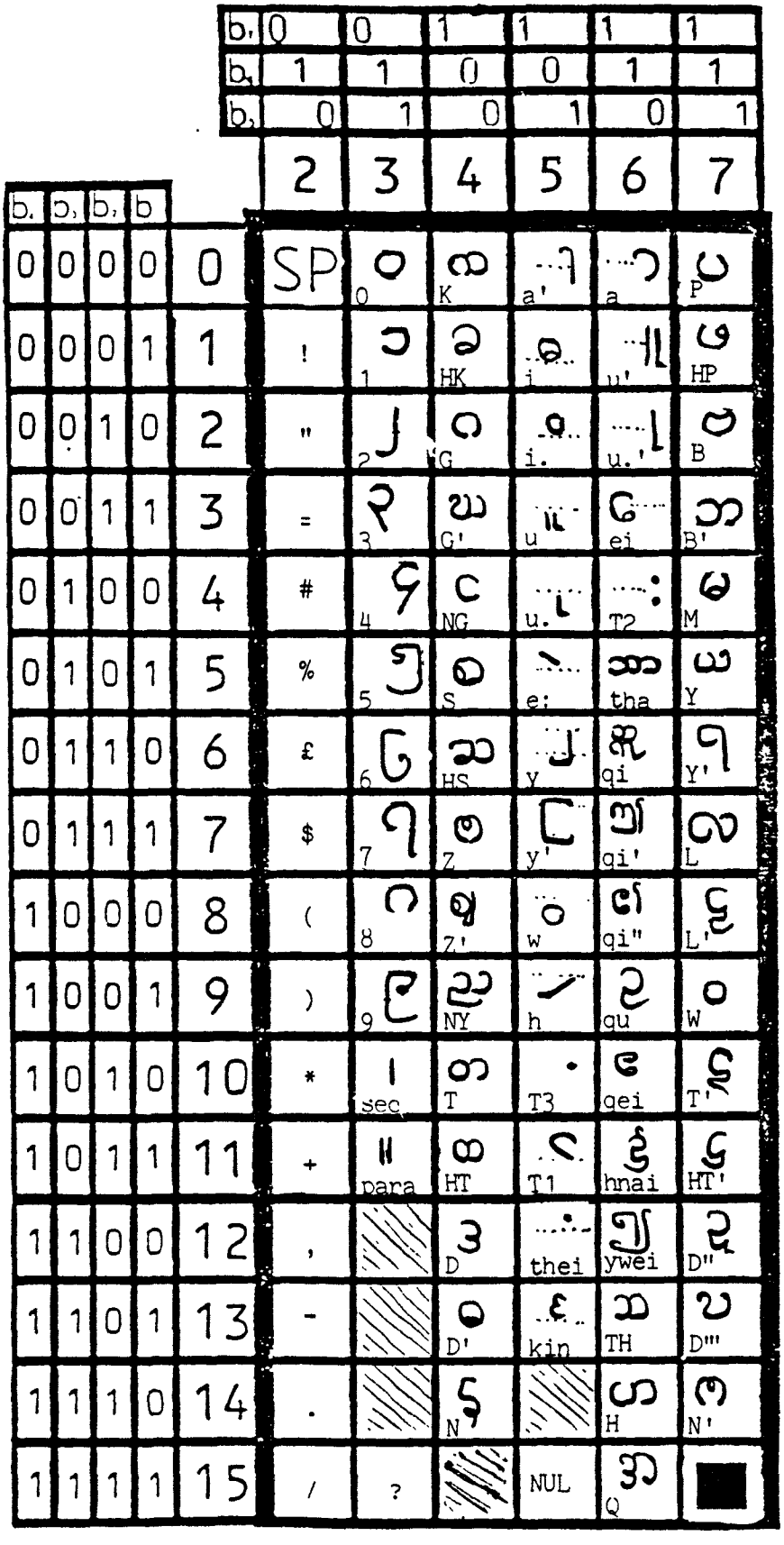


Figure 32 BURMESE G0 PRIMARY CHARACTER SET

Column 5 characters are non-spacing when transmitted in a packet with Y=26

The Character in position 7/15 occupies an area equivalent to that of any character that does not include a descender. It is thus a rectangle surrounded by the background colour

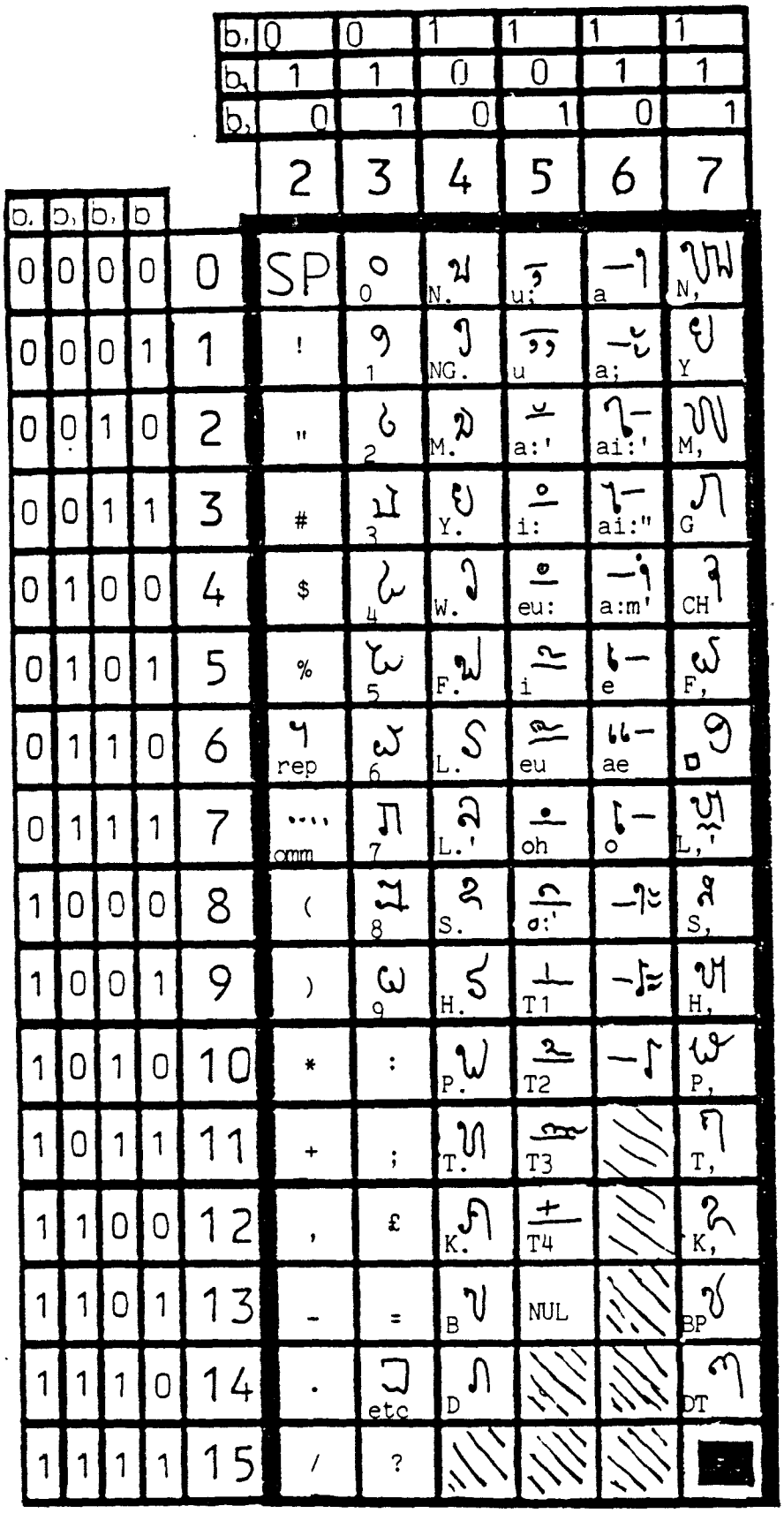


Figure 33 LAO G0 PRIMARY CHARACTER SET

Column 5 characters are non-spacing when transmitted in a packet with Y=26

The Character in position 7/15 occupies an area equivalent to that of any character that does not include a descender. It is thus a rectangle surrounded by the background colour

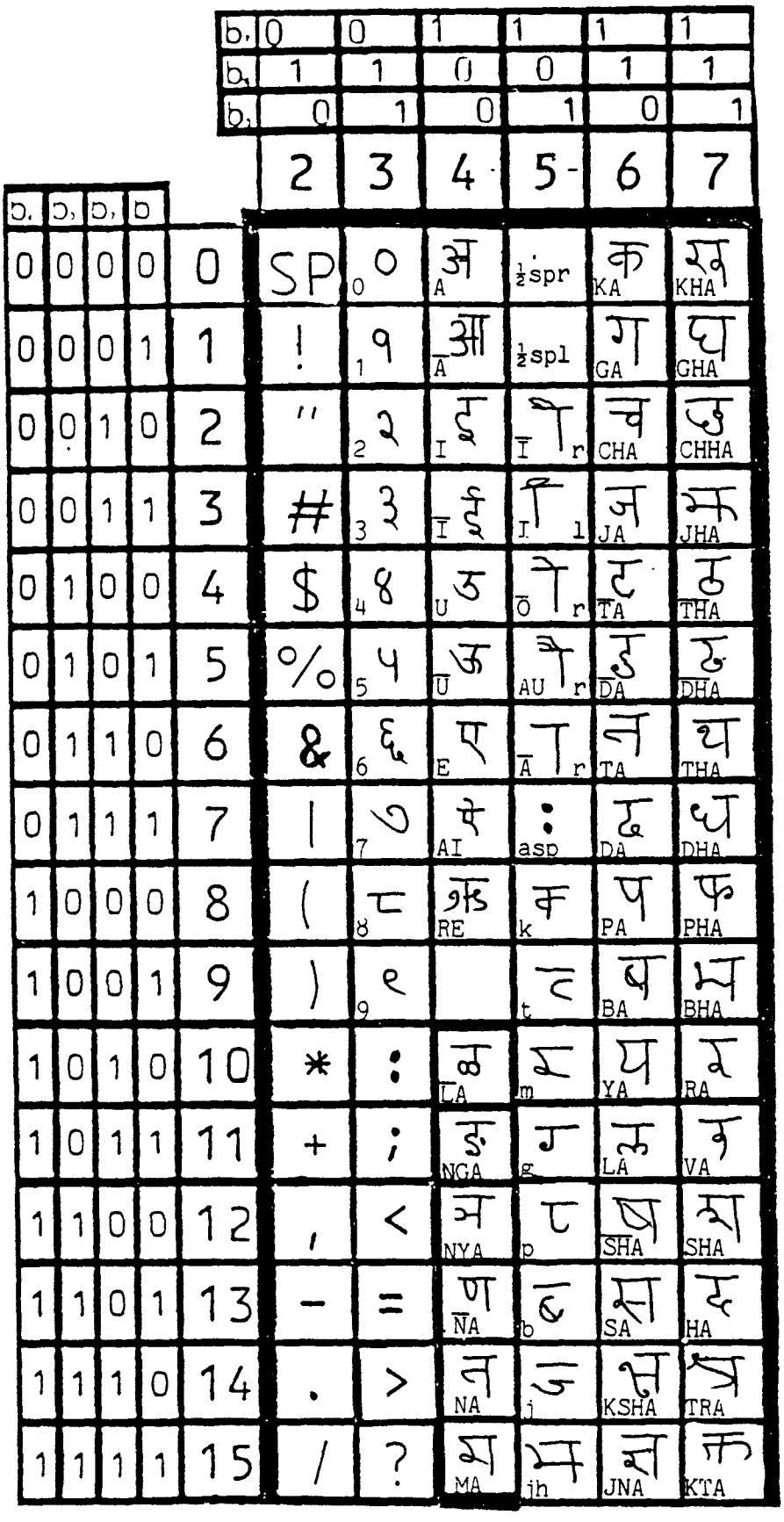


Figure 34 DEVANAGARI G0 PRIMARY SET

The characters in column 5 occupy half the width of other characters. "l" and "r" resepctively indicate that they are placed at the left or right hand side of other characters from the other columns.

The characters ½spl and ½spr are half width spaces and respectively occupy a position equivalent to the left or right hand half of a standard width character.

The characters in positions 5/8 to 5/15 are used to form the left hand half of certain conjunct consonants.

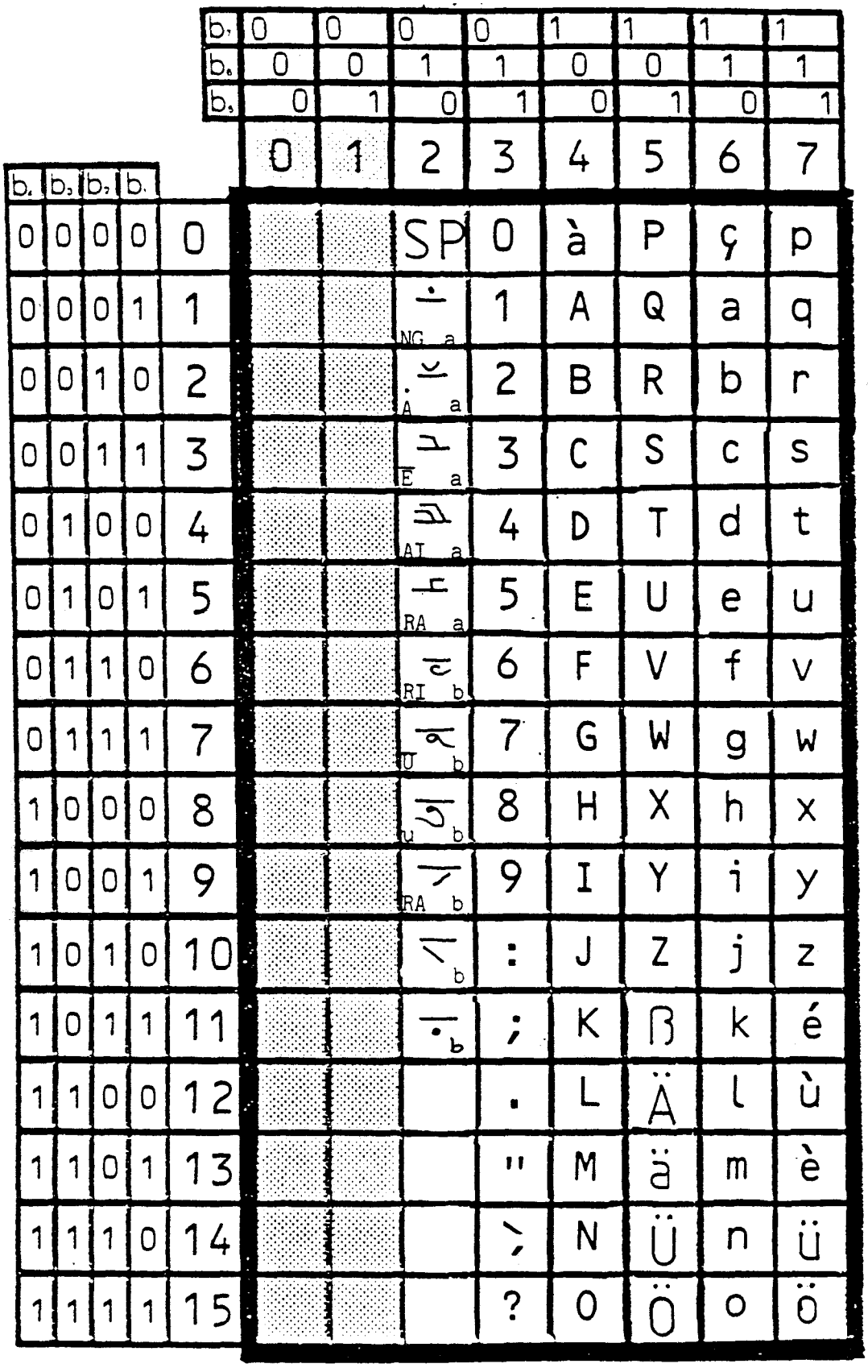


Figure 35 DEVANAGARI G2 SUPPLEMENTARY SET

The characters 2/1 to 2/9 are MATRAS for use with G0 set characters
The character 2/10 is the HALANT for use with G0 set characters.
The character 2/11 is a MODIFIER for use with G0 set characters.
The character 2/0 acts as a NUL MATRA as well as SPACE.

Blank positions in the code table are reserved.

OPTION NUMBER C12 C13 C14	CODE IN PACKETS WITH Y=28 SEE FIGURE 14 CHARACTER SET NUMBER 42	
1 000	Serbo-Croat Macedonian (Cyrillic)	see figure 27 and 27(a)
2 001	German (Latin)	see figure 3 and 3(a)
3 010	Swedish/Finnish (Latin)	see figure 3 and 3(a)
4 011	Italian (Latin)	see figure 3 and 3(a)
5 100	Bulgarian/Russian (Cyrillic)	see figure 27 and 27(a)
6 101	Serbo-Croat (Latin)	see figure 3 and 3(a)
7 110	Czechoslovak (Latin)	see figure 3 and 3(a)
8 111	Ruthenian/Ukranian (Cyrillic)	see figure 27 and 27(a)

Figure 36 CYRILLIC AND LATIN ASSOCIATED PRIMARY SETS OPTIONS TO G0 CODE TABLE

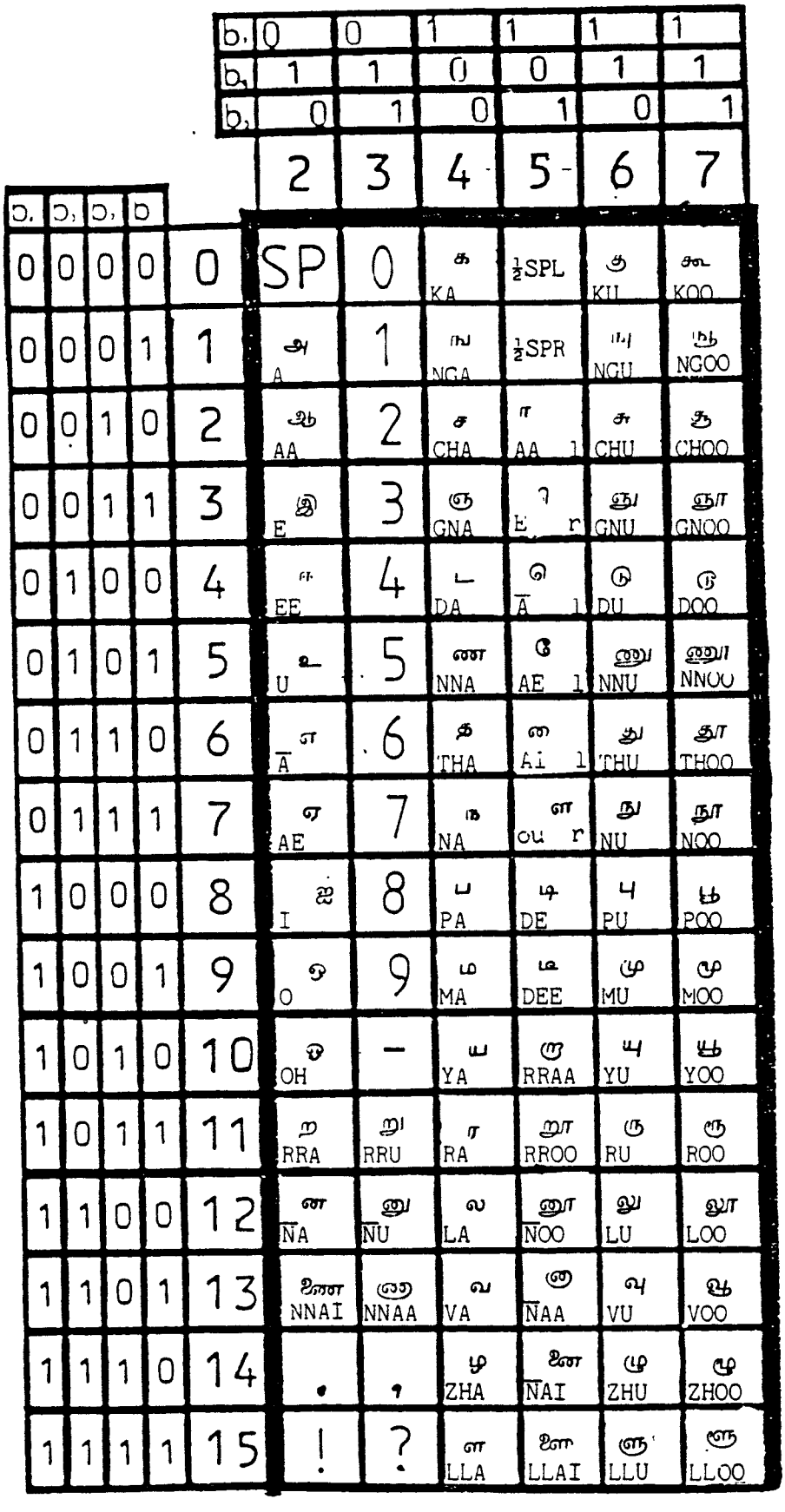
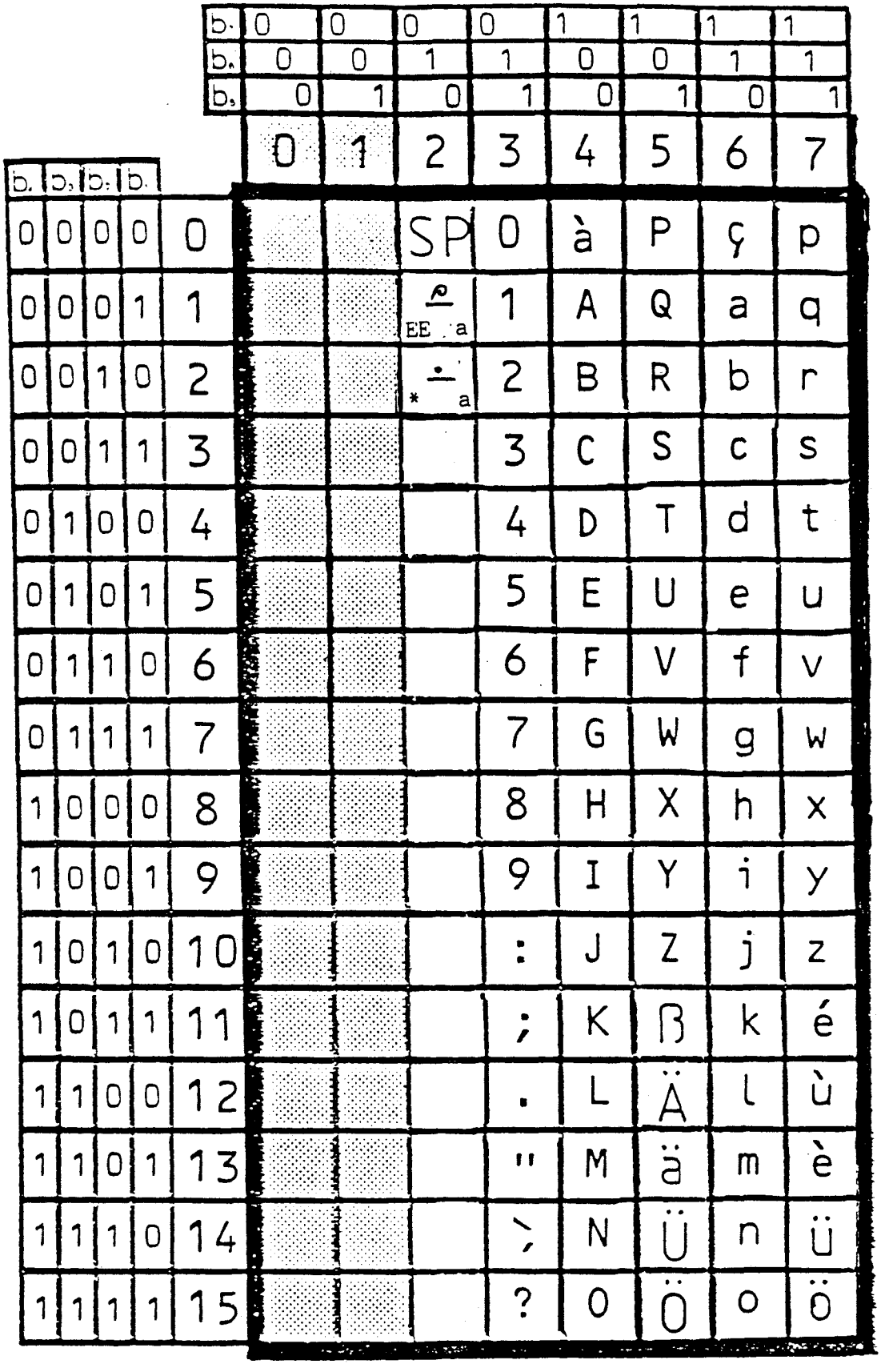


Figure 37 TAMIL PRIMARY GO SET

The characters in positions 5/0 to 5/7 occupy half the width of other characters. "l" and "r" indicate that they are placed at the left or right hand side of full width characters respectively.

The characters ½SPL and ½SPR are half width spaces and respectively occupy a position equivalent to the left or right hand half of a full width character



b4	b3	b2	b1		0	1	2	3	4	5	6	7
0	0	0	0	0			SP	0	à	P	ç	p
0	0	0	1	1			◌̊ EE a	1	A	Q	a	q
0	0	1	0	2			◌̇ * a	2	B	R	b	r
0	0	1	1	3				3	C	S	c	s
0	1	0	0	4				4	D	T	d	t
0	1	0	1	5				5	E	U	e	u
0	1	1	0	6				6	F	V	f	v
0	1	1	1	7				7	G	W	g	w
1	0	0	0	8				8	H	X	h	x
1	0	0	1	9				9	I	Y	i	y
1	0	1	0	10				:	J	Z	j	z
1	0	1	1	11				;	K	ß	k	é
1	1	0	0	12				.	L	Ä	l	ù
1	1	0	1	13				"	M	ä	m	è
1	1	1	0	14				◌̀	N	Ü	n	ü
1	1	1	1	15				?	O	Ö	o	ö

Figure 38 TAMIL G2 SUPPLEMENTARY SET

The characters 2/1 and 2/2 are diacritical marks for use with G0 set characters

The character 2/2 is used to cancel an implicit vowel.

The character SP (2/0) in addition to the function of SPACE can act as a NUL diacritical mark.

Blank positions in the code table are reserved. If these codes are received they are to be interpreted as SPACE (2/0).

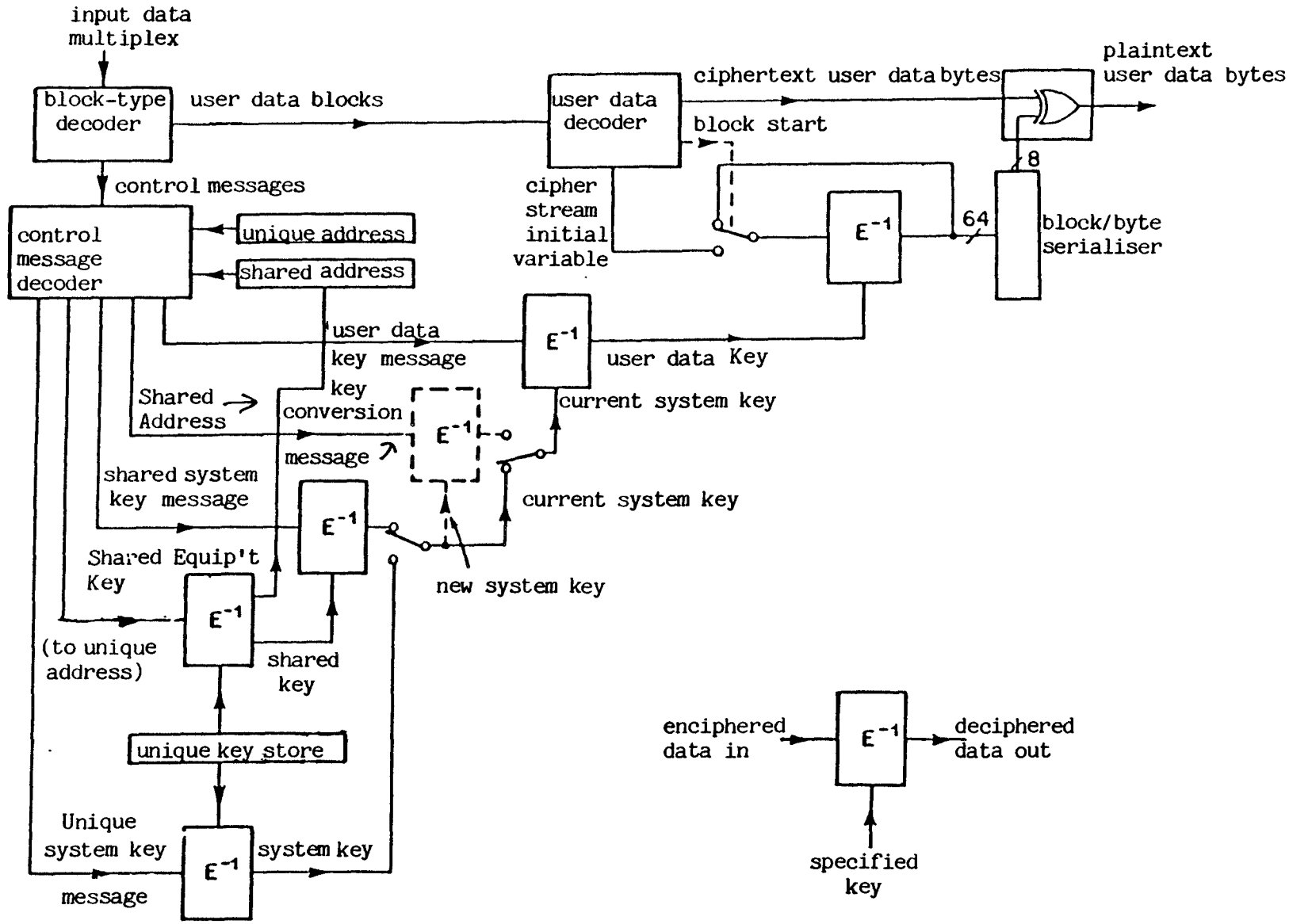


Figure 39 INDEPENDENT DATA SERVICES BLOCK FORMAT B

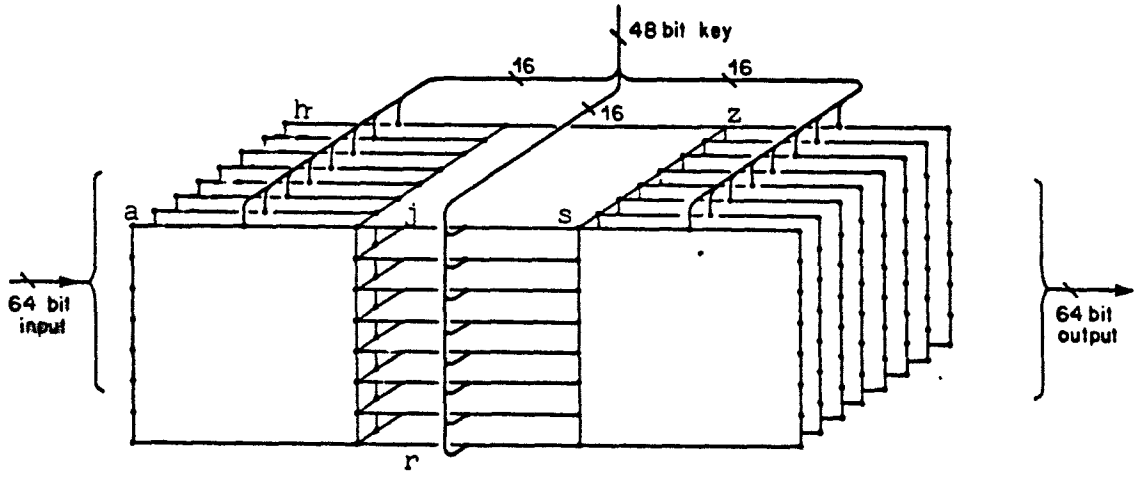


Figure 40 BLOCK ENCIPHERMENT ALGORITHM
ENCRYPTION METHOD 2 (see figure 26).

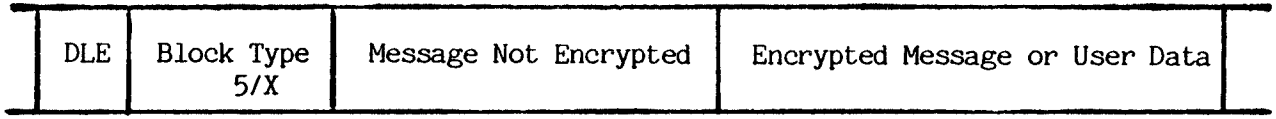


Figure 41 GENERAL FORM OF DATA BLOCK

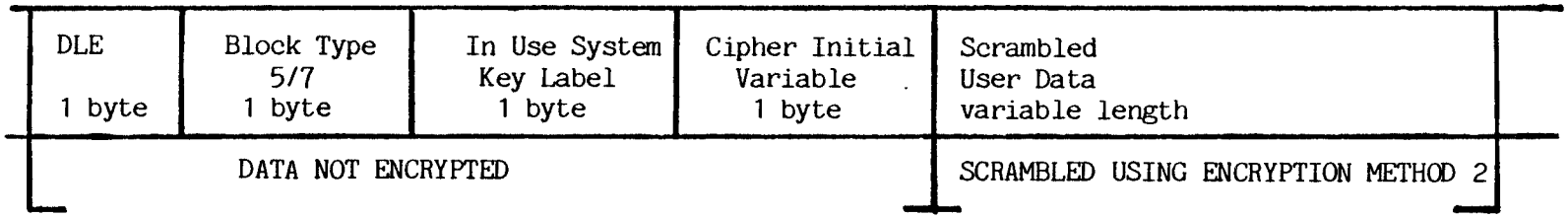


Figure 41(a) COMMON USER DATA BLOCK

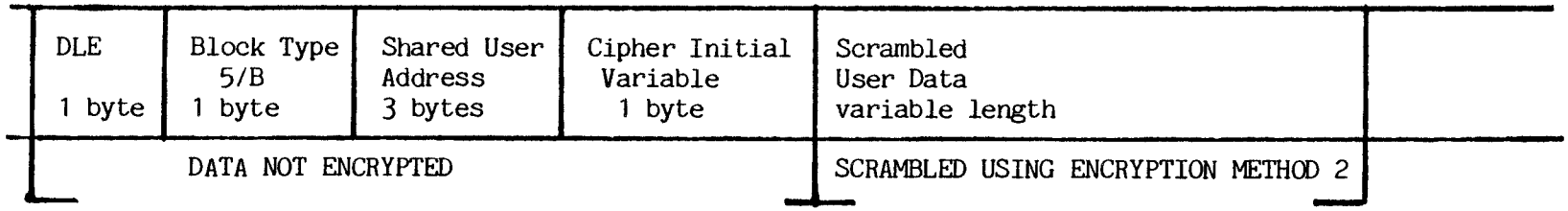


Figure 41(b) GROUP USER DATA BLOCK

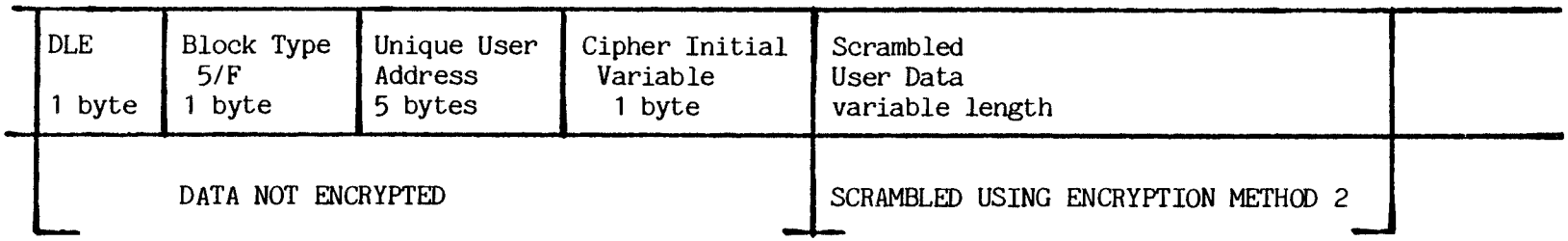


Figure 41(c) UNIQUE USER DATA BLOCK

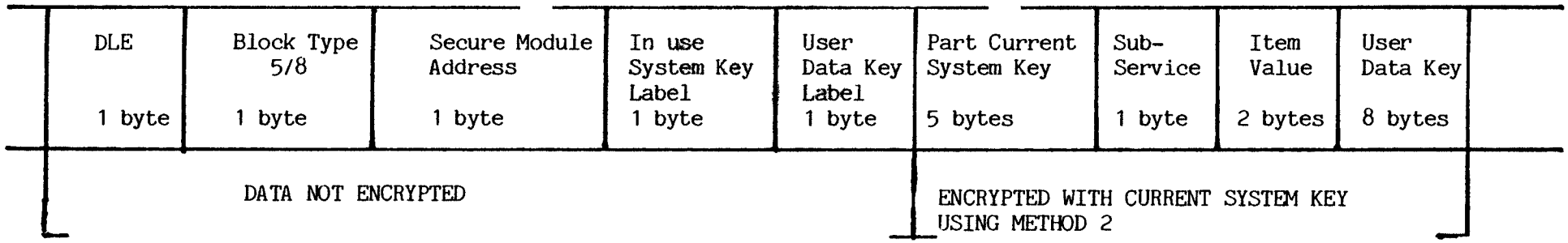


Figure 41(d) USER DATA KEY MESSAGE BLOCK

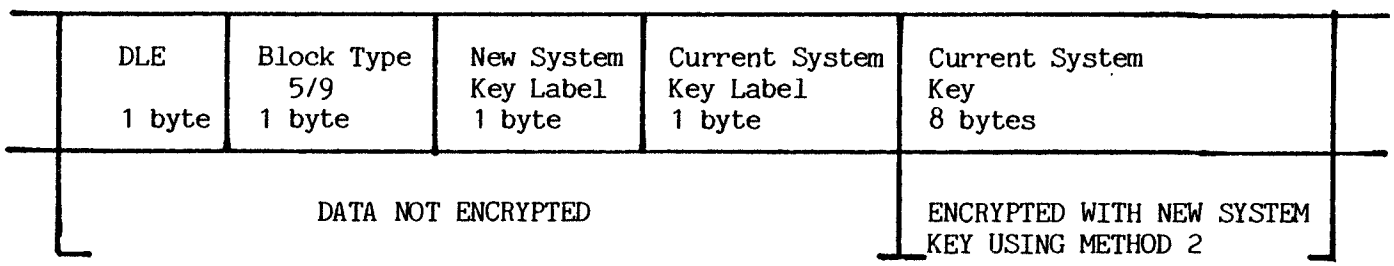


Figure 41(e) KEY CONVERSION MESSAGE BLOCK

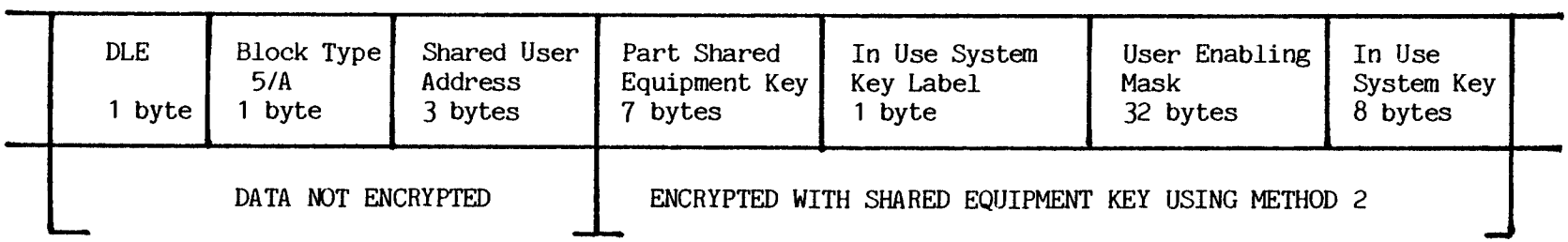


Figure 41(f) SHARED SYSTEM KEY MESSAGE BLOCK

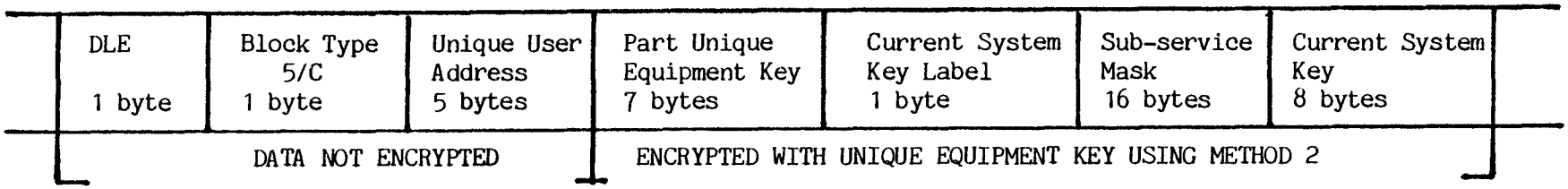


Figure 41(g) UNIQUE SYSTEM KEY MESSAGE BLOCK

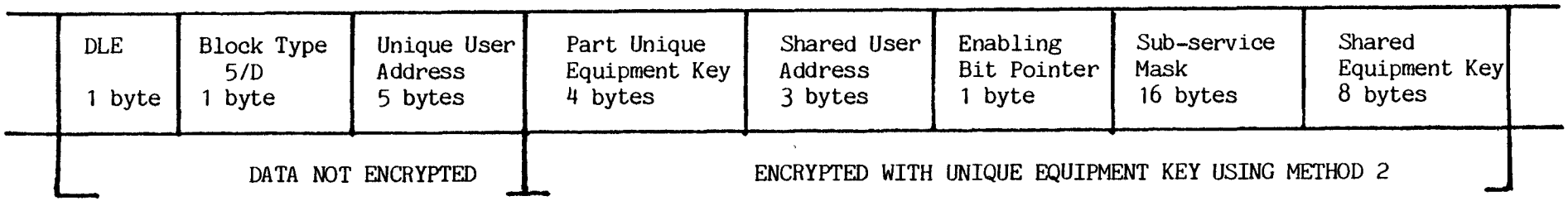


Figure 41(h) SHARED EQUIPMENT KEY MESSAGE BLOCK

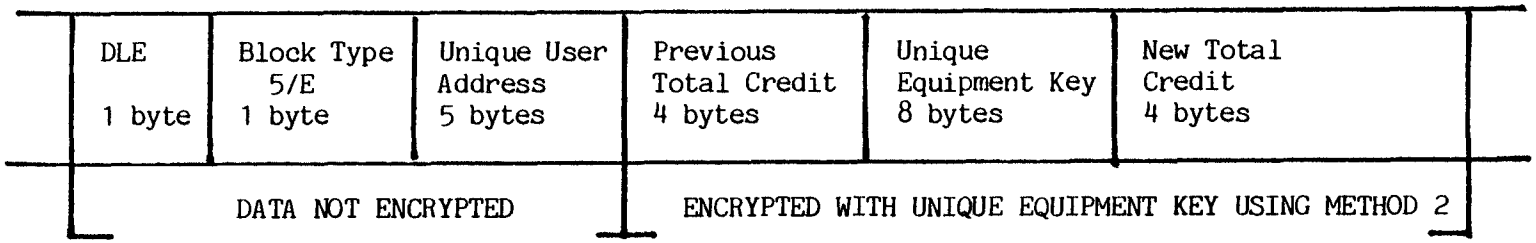


Figure 41(j) OVER-AIR CREDIT MESSAGE BLOCK

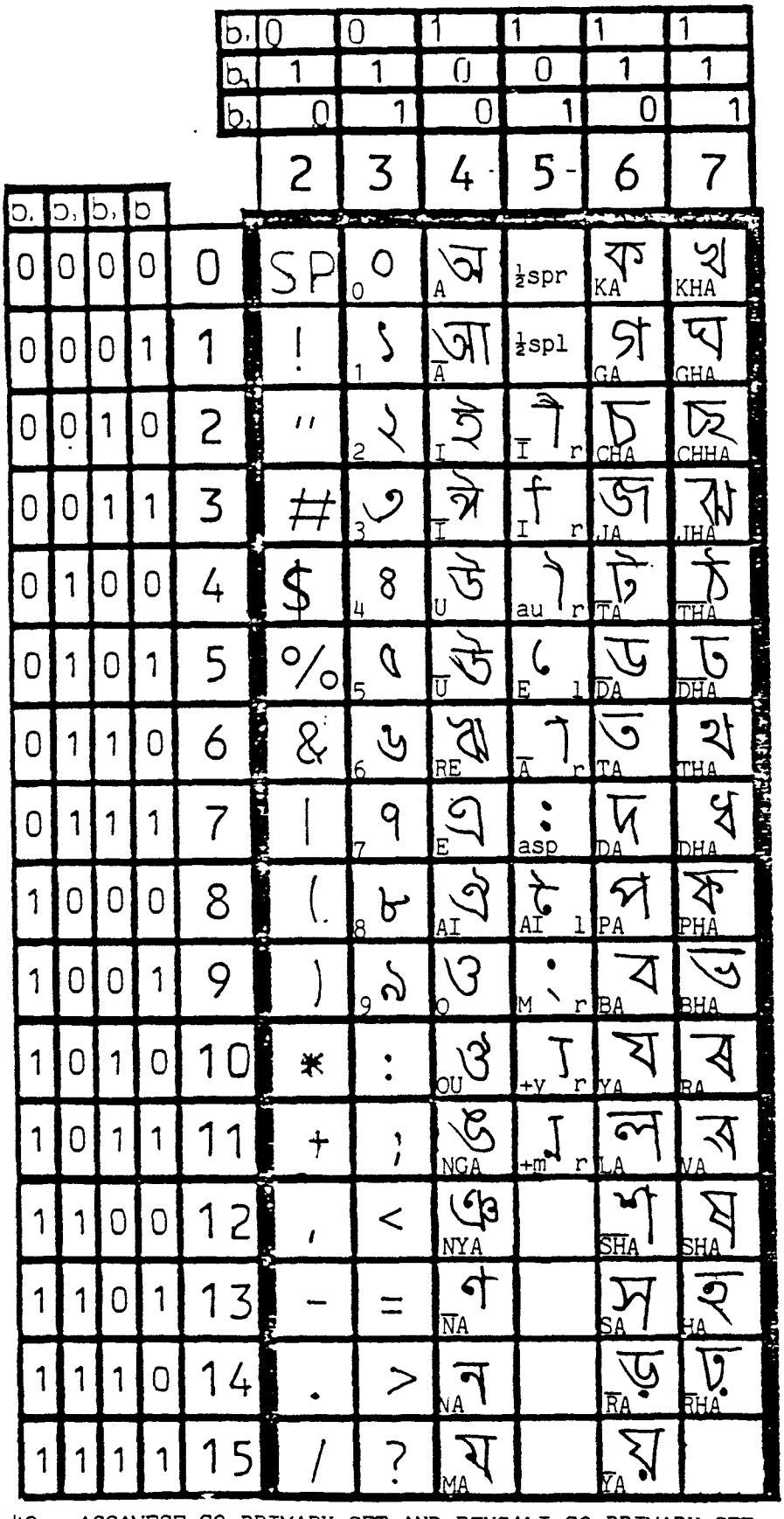


Figure 42 ASSAMESE GO PRIMARY SET AND BENGALI GO PRIMARY SET

The characters in column 5 occupy half the width of other characters. "l" and "r" respectively indicate that they are placed at the left or right hand side of other characters from other columns.

The characters ½spl and ½spr are half width spaces and respectively occupy a position equivalent to the left or right hand half of a standard width character.

The characters in positions 5/10 and 5/11 are used to form the right hand half of certain conjunct consonants.

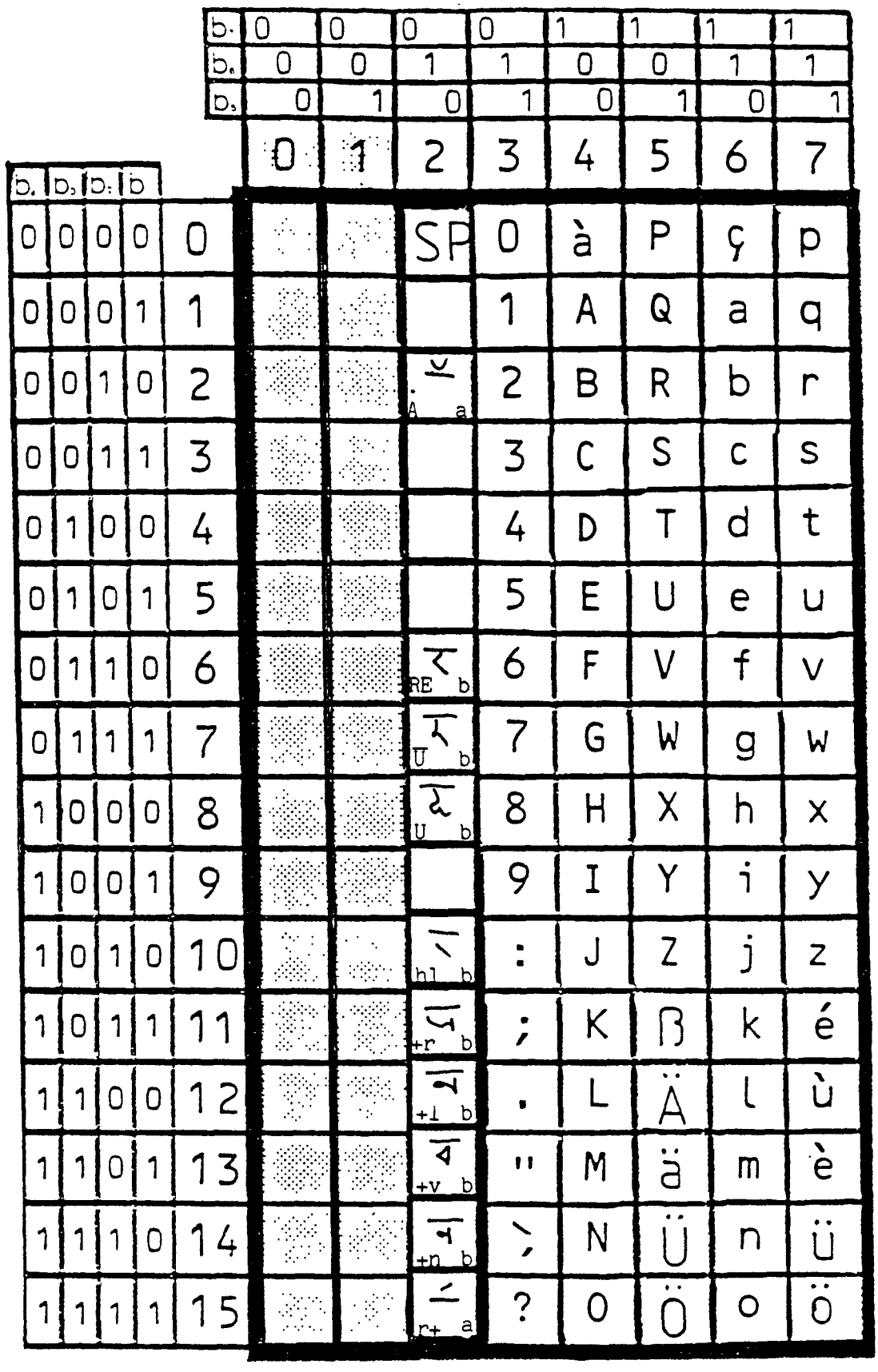


Figure 43 ASSAMESE G2 SUPPLEMENTARY SET AND BENGALI G2 SUPPLEMENTARY SET

The characters 2/2 and 2/6 to 2/8 are VOWEL SIGNS for use with G0 set characters
The character 2/10 is a VOWEL CANCELLING sign for use with G0 set characters.
The character 2/11 to 2/15 are used to form CONJUNCT CONSONANTS with G0 set characters.

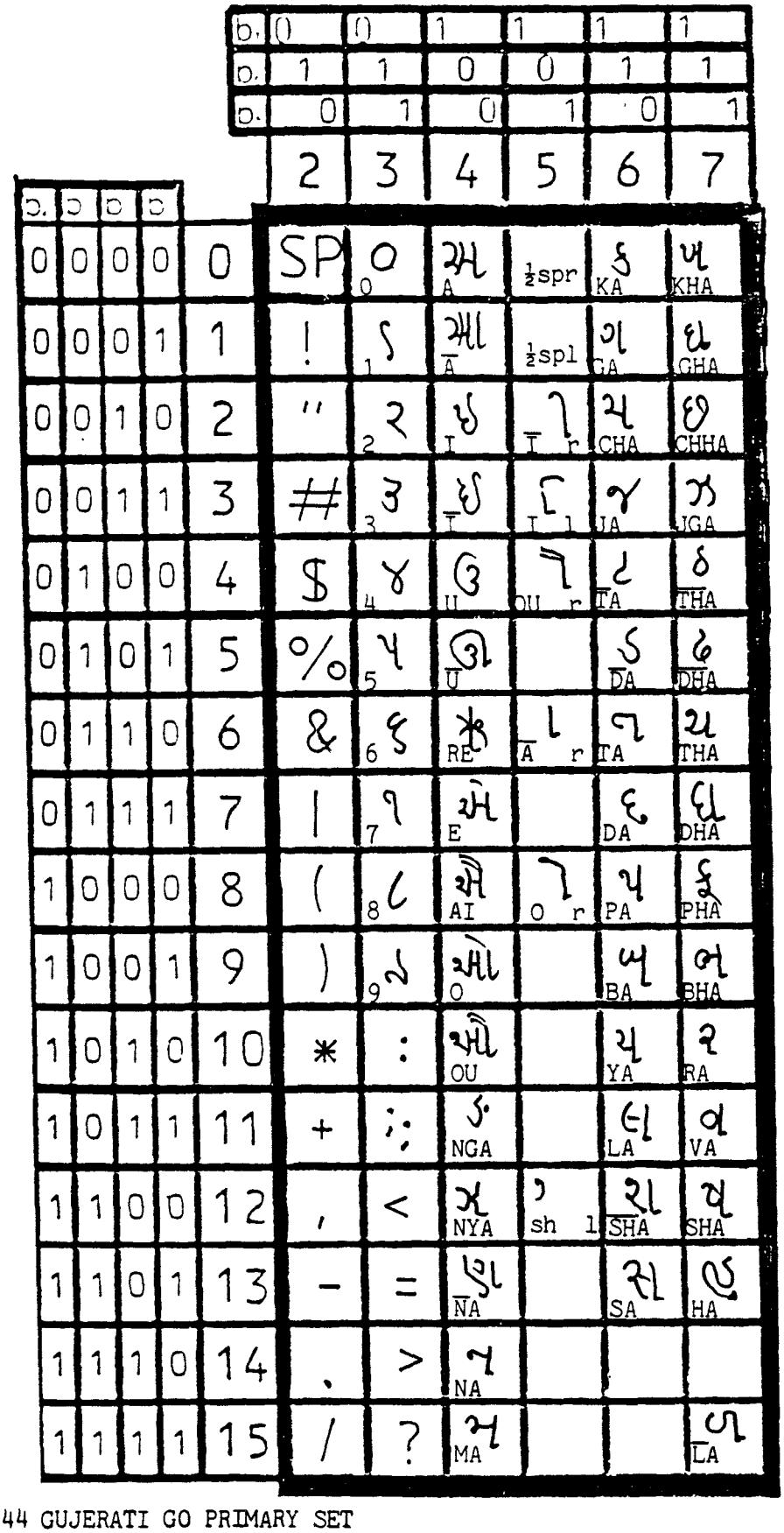


Figure 44 GUJERATI GO PRIMARY SET

The characters in column 5 occupy half the width of other characters. "l" and "r" respectively indicate that they are placed at the left or right hand side of other characters from other columns.

The characters ½spl and ½spr are half width spaces and respectively occupy a position equivalent to the left or right hand half of a standard width character.

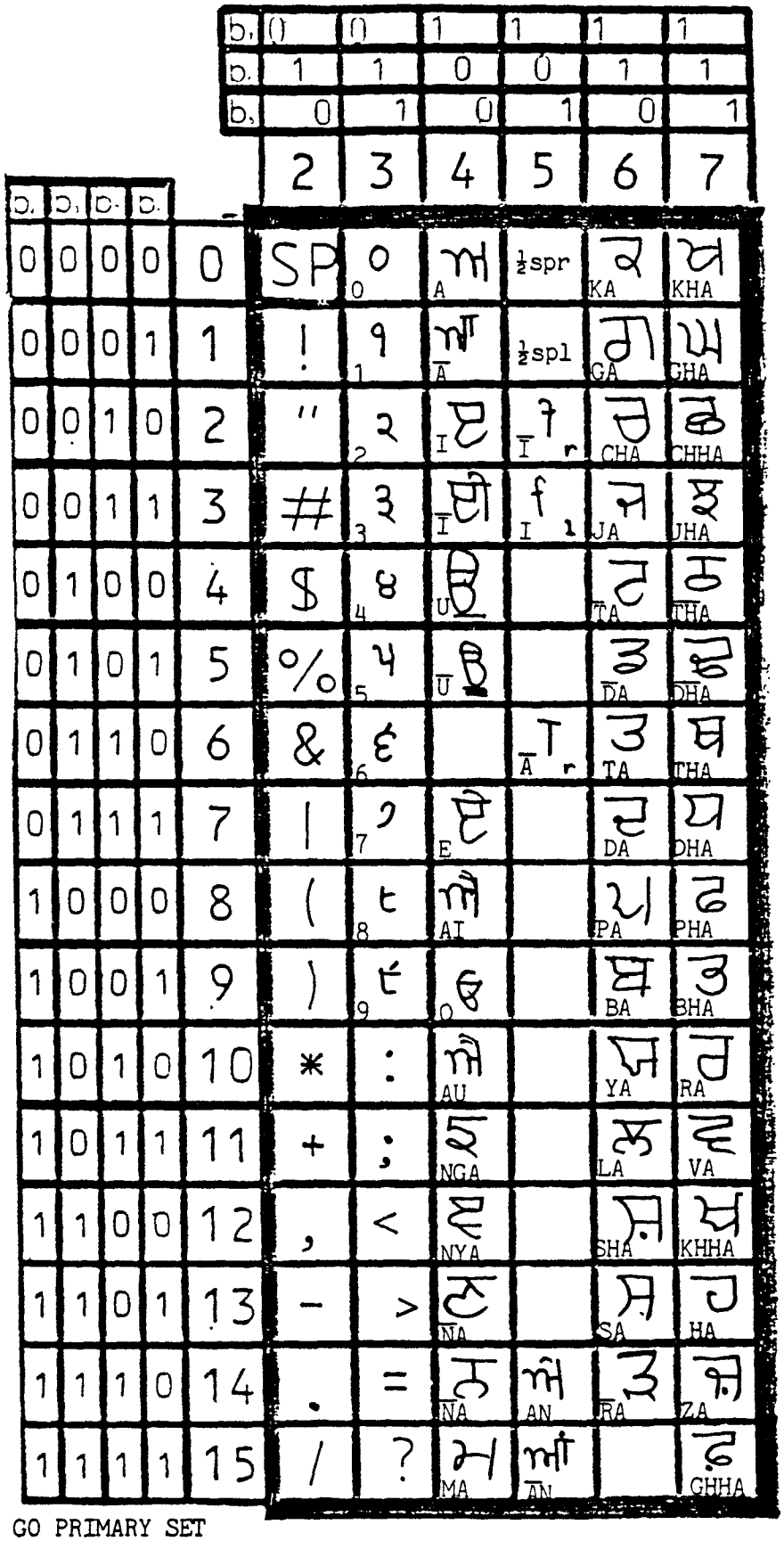


Figure 46 PUNJABI GO PRIMARY SET

The characters in column 5 with bit 4 set to 0 occupy half the width of other characters. "l" and "r" respectively indicate that they are placed at the left or right hand side of other characters.
The characters ½ spr and ½ spl are half width spaces and respectively occupy a position equivalent to the left or right hand half of a standard width character.

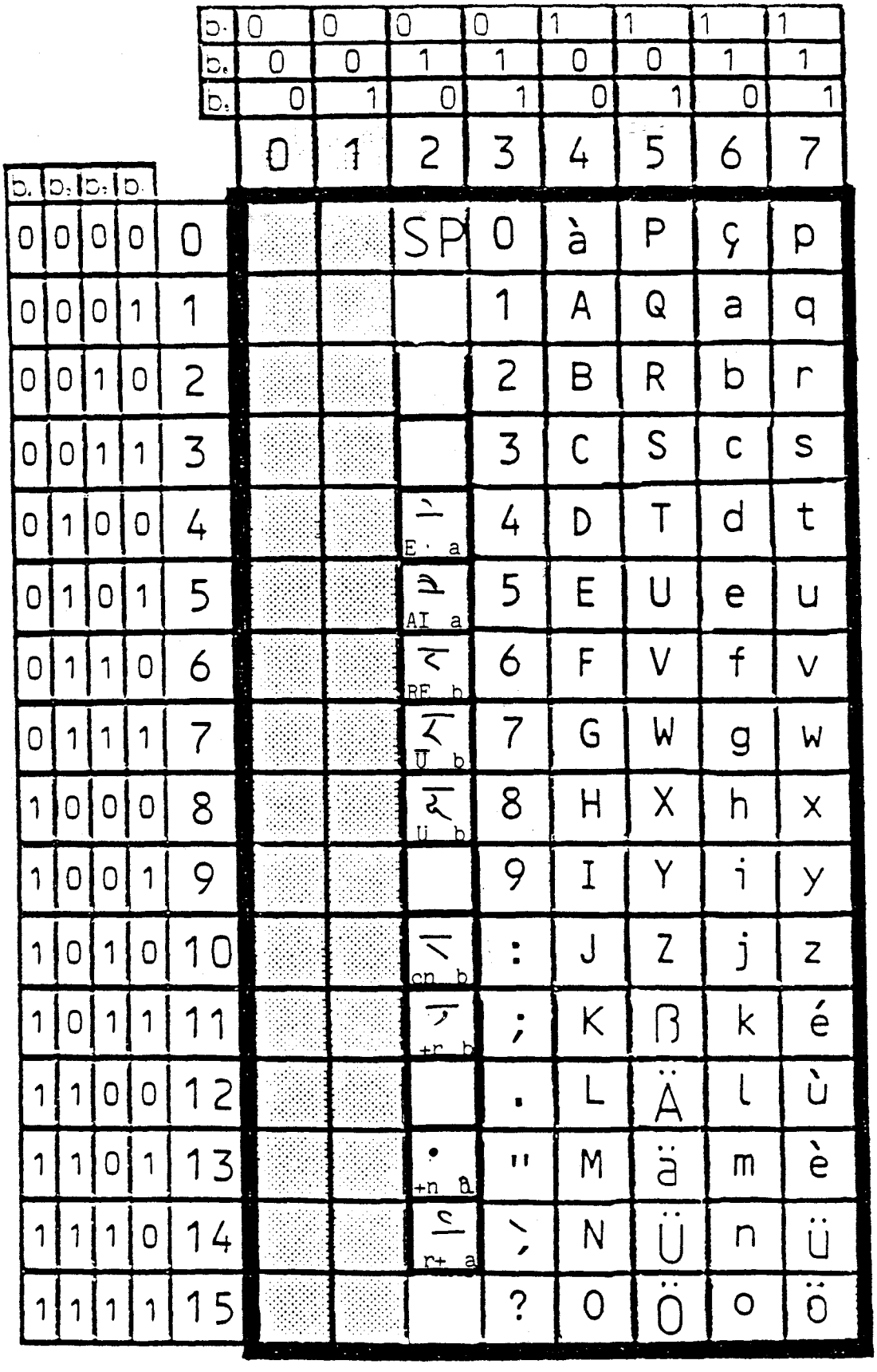


Figure 45 GUJERATI G2 SUPPLEMENTARY SET

The characters 2/4 to 2/8 are VOWEL SIGNS for use with G0 set characters.
The character 2/10 is a VOWEL CANCELLING sign for use with G0 set character:
The character 2/11, 2/13 and 2/14 are sued to form CONJUNCT CONSONANTS with G0 set characters.
The character 2/0 functions as a NUL diacritical mark as well as SPACE.

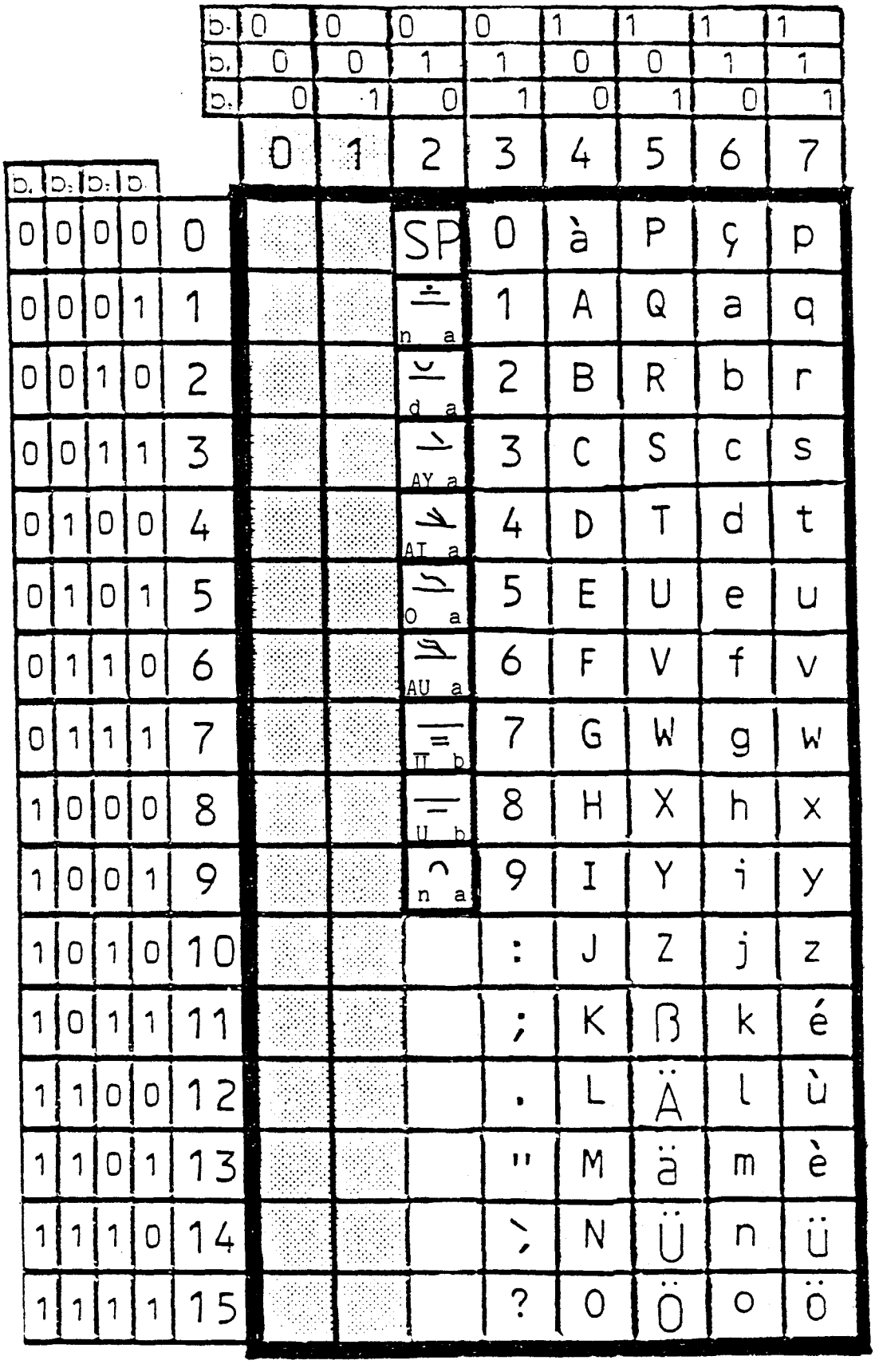


Figure 47 PUNJABI G2 SUPPLEMENTARY SET

The characters 2/1 to 2/9 are MATRAS for use with the G0 set characters. The character 2/0 acts as a NUL MATRA as well as SPACE.

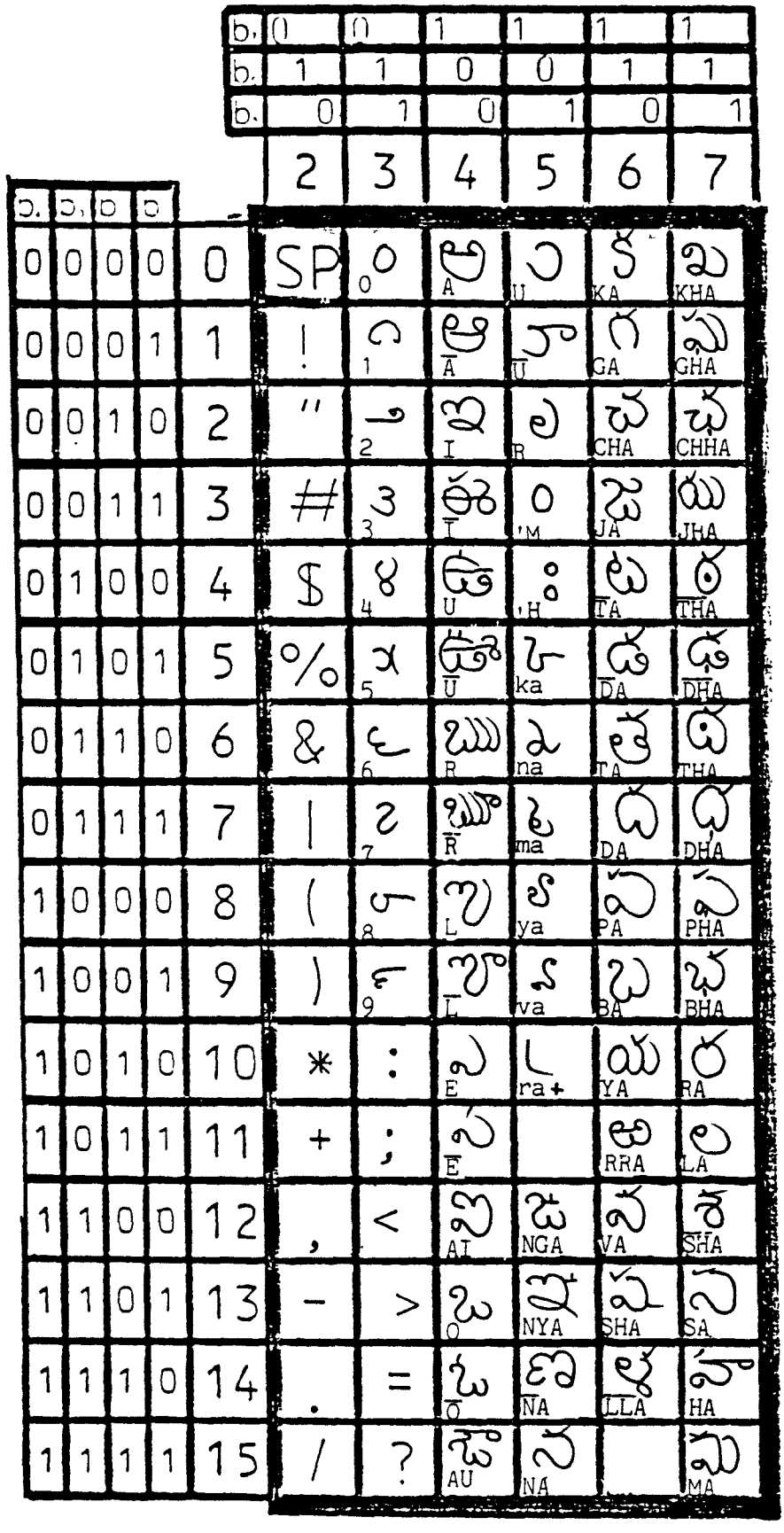


Figure 48 TELGU PRIMARY GO SET

Characters in column 4 are independent vowels; characters 5/0 to 5/ modify an implicit vowel and characters 5/5 to 5/10 form conjunct consonants.

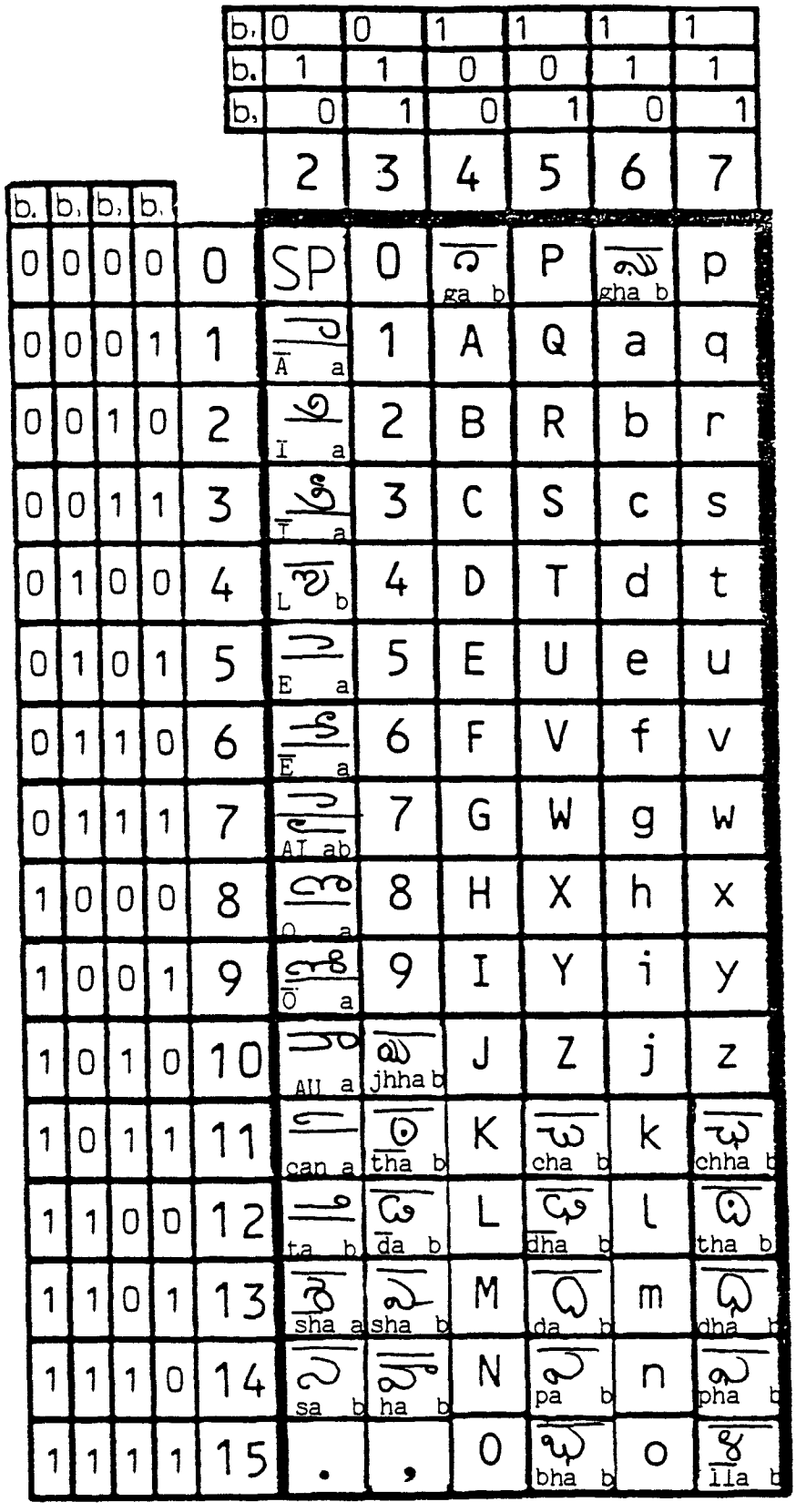


Figure 49 TELGU SUPPLEMENTARY G2 SET

Characters 2/1 to 2/10 modify an implicit vowel; character 2/11 cancels an implicit vowel and other Telegu characters are used to form conjunct consonants.

The character SPACE (2/0) acts as a NUL vowel modifier as well as space.

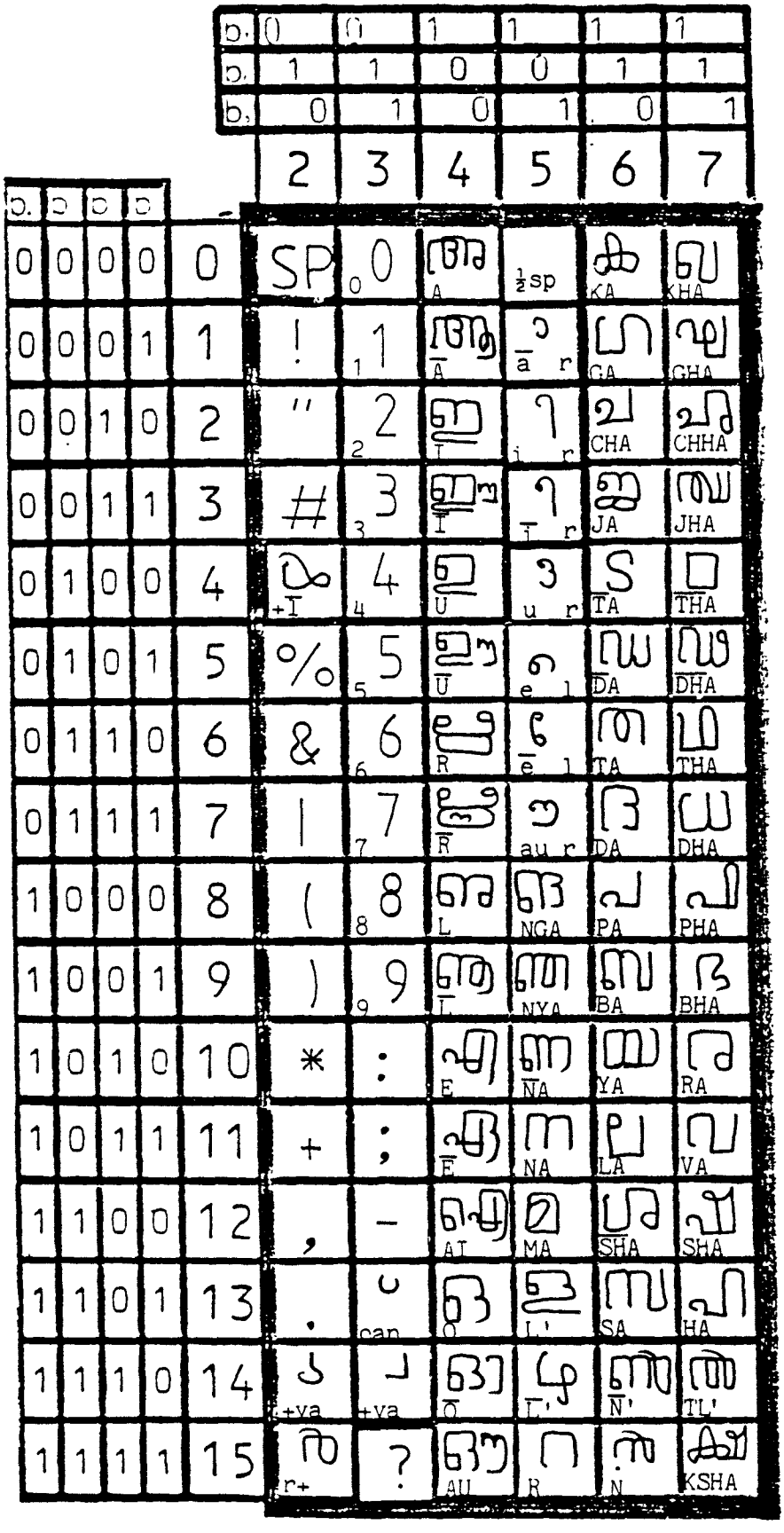


Figure 50 MALAYALAM PRIMARY G0 SET

The character 5/0 is a half width space.
The characters 2/14 3/13 3/14 5/1 5/2 5/3 5/6 occupy half a standard character width.
The characters 4/0 4/1 4/5 4/12 4/14 4/15 5/9 6/14 7/3 7/14 7/15 occupy one and one half standard character widths.

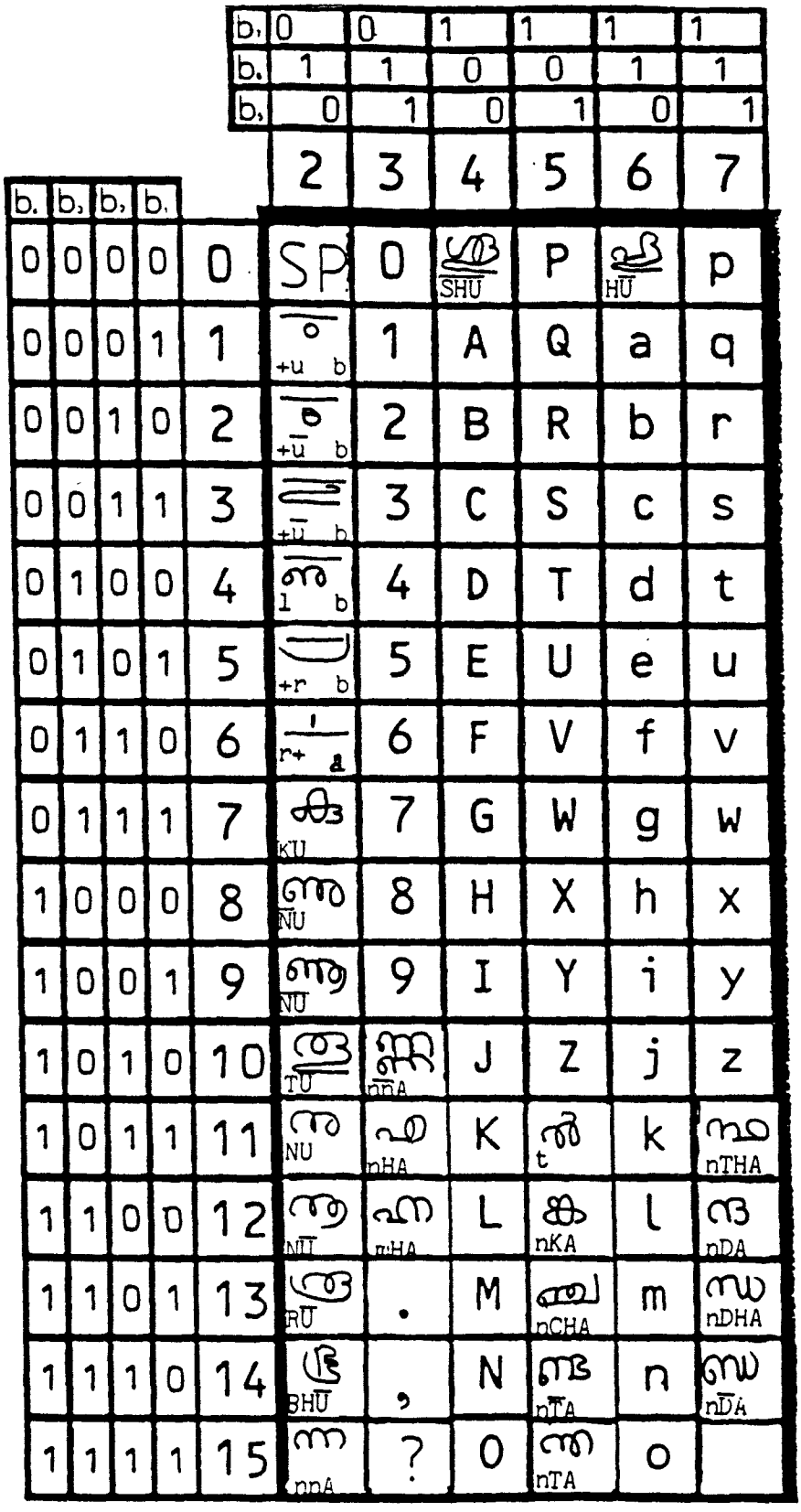


Figure 51 MALAYALAM SUPPLEMENTARY G2 SET

The character 2/0 acts as a NUL diacritical mark as well as SPACE.
The characters 2/1 to 2/6 are diacritical marks for use with G0 set characters.
The characters 2/7 to 2/14, 4/0 and 6/0 are special syllables using the vowel 'U'.
Other Malayalam characters are used for conjunct consonants.

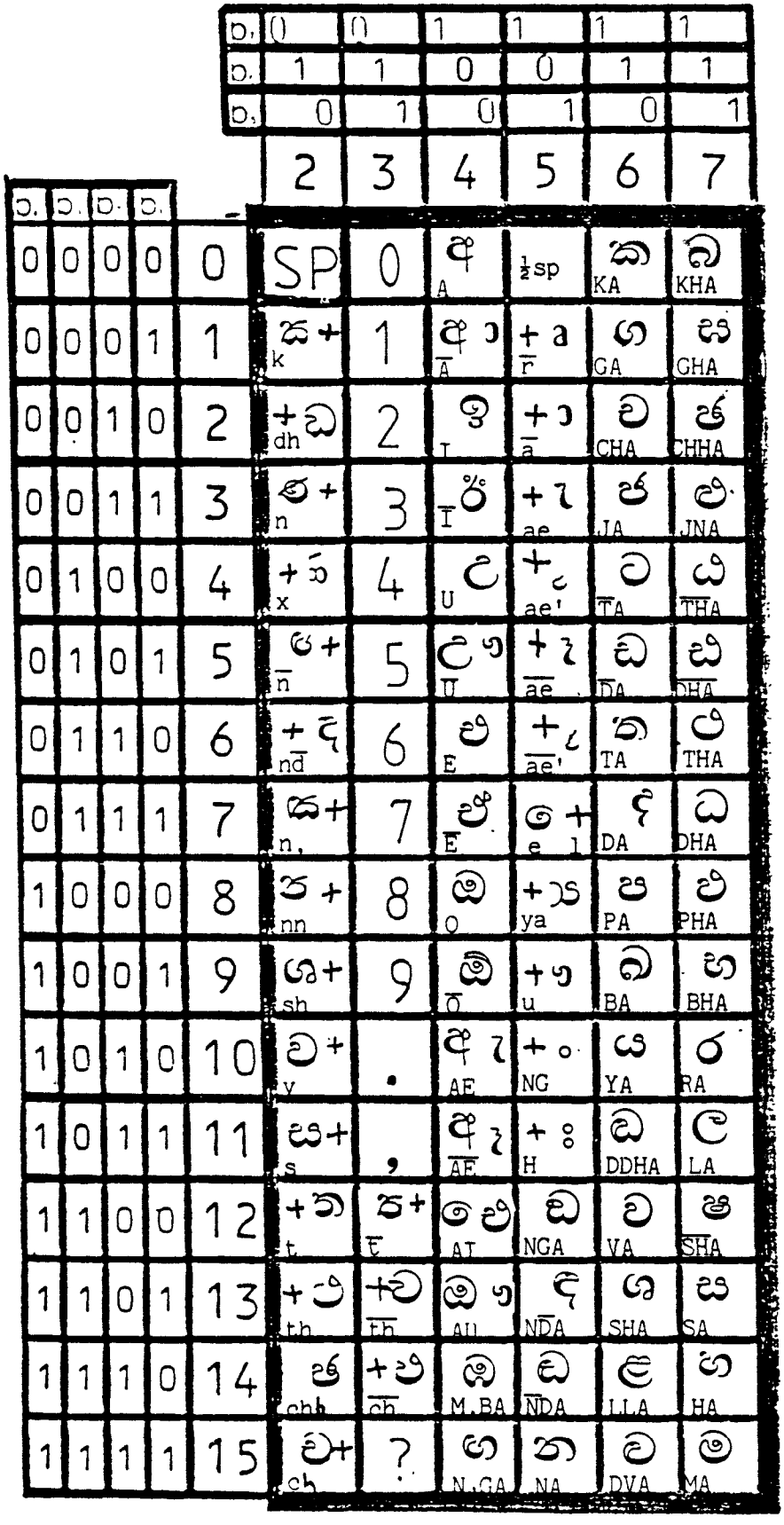


Figure 52 SINHALESE G0 PRIMARY

The characters 2/1 to 2/15 and 3/12 to 3/14 form conjunct consonants.
The characters 4/1, 4/5, 4/10 to 4/13 occupy one and one half standard character widths.
The characters 5/1 to 5/6, 5/9, 5/10 and 5/11 occupy one half of a standard character width.
The character 5/0 is a half width space.

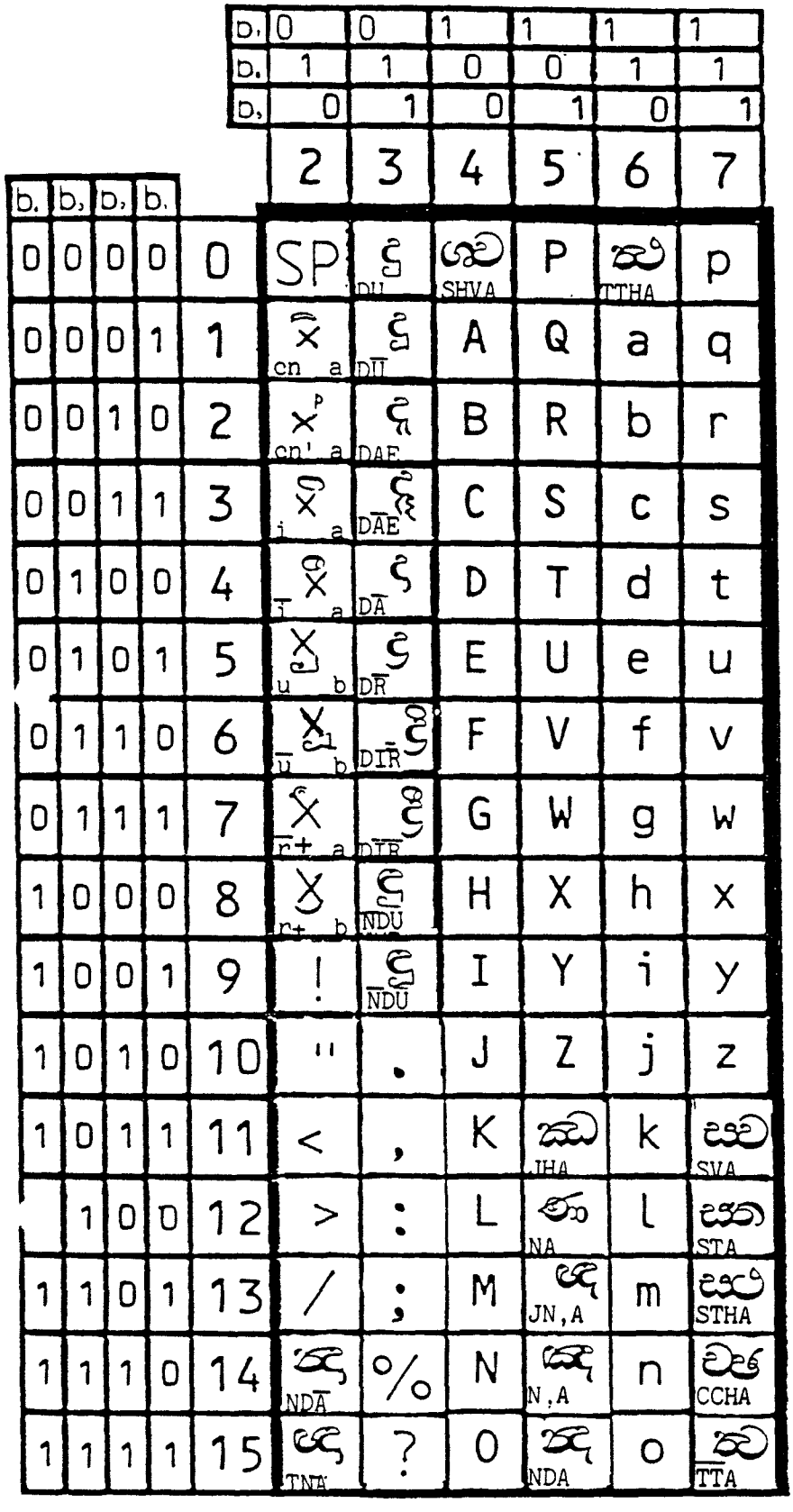


Figure 53 SINHALESE G2 SUPPLEMENTARY SET

The characters 2/1 to 2/8 are diacritical marks for use with G0 set characters.
The character 2/0 (SPACE) can also act as a NUL diacritical mark.
Sinhalese characters that are not diacritical marks, but excluding characters 3/0 to 3/9 occupy one and one half standard character widths.
The compound vowels characters in the G0 set can also be presented by the use of simple vowel characters and a diacritical mark.

							Second Byte 第2バイト																							
							b7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
							b6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
							b4	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
							b3	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
							b2	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
First Byte							b1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
第1バイト							点	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
b7	b6	b5	b4	b3	b2	b1	区																							
0	1	0	0	0	0	1	1	(SP)	、	。	，	．	・	：	；	？	！									ヽ	ヾ	ゝ	ゞ	〃
0	1	0	0	0	1	0	2																							
0	1	0	0	0	1	1	3																0	1	2	3	4	5	6	7
0	1	0	0	1	0	0	4	ぁ	あ	ぃ	い	ぅ	う	ぇ	え	ぉ	お	か	が	き	ぎ	く	ぐ	け	げ	こ	ご	さ	ざ	し
0	1	0	0	1	0	1	5	ァ	ア	ィ	イ	ゥ	ウ	ェ	エ	ォ	オ	カ	ガ	キ	ギ	ク	グ	ケ	ゲ	コ	ゴ	サ	ザ	シ
0	1	1	0	0	0	0	16	亜	唖	娃	阿	哀	愛	挨	姶	逢	葵	茜	穐	悪	握	渥	旭	葦	芦	鯵	梓	圧	斡	扱
0	1	1	0	0	0	1	17	院	陰	隠	韻	吋	右	宇	烏	羽	迂	雨	卯	鵜	窺	丑	碓	臼	渦	嘘	唄	欝	蔚	鰻
0	1	1	0	0	1	0	18	押	旺	横	欧	殴	王	翁	襖	鴬	鴎	黄	岡	沖	荻	億	屋	憶	臆	桶	牡	乙	俺	卸
0	1	1	0	0	1	1	19	魁	晦	械	海	灰	界	皆	絵	芥	蟹	開	階	貝	凱	劾	外	咳	害	崖	慨	概	涯	碍
0	1	1	0	1	0	0	20	粥	刈	苅	瓦	乾	侃	冠	寒	刊	勘	勧	巻	喚	堪	姦	完	官	寛	干	幹	患	感	慣
0	1	1	0	1	0	1	21	機	帰	毅	気	汽	畿	祈	季	稀	紀	徽	規	記	貴	起	軌	輝	飢	騎	鬼	亀	偽	儀
0	1	1	0	1	1	0	22	供	侠	僑	兇	競	共	凶	協	匡	卿	叫	喬	境	峡	強	彊	怯	恐	恭	挟	教	橋	況
0	1	1	0	1	1	1	23	掘	窟	沓	靴	轡	窪	熊	隈	粂	栗	繰	桑	鍬	勲	君	薫	訓	群	軍	郡	卦	袈	祁
0	1	1	1	0	0	0	24	検	権	牽	犬	献	研	硯	絹	県	肩	見	謙	賢	軒	遣	鍵	険	顕	験	鹸	元	原	厳
0	1	1	1	0	0	1	25	后	喉	坑	垢	好	孔	孝	宏	工	巧	巷	幸	広	庚	康	弘	恒	慌	抗	拘	控	攻	昂
0	1	1	1	0	1	0	26	此	頃	今	困	坤	墾	婚	恨	懇	昏	昆	根	梱	混	痕	紺	艮	魂	些	佐	叉	唆	嵯
0	1	1	1	0	1	1	27	察	拶	撮	擦	札	殺	薩	雑	皐	鯖	捌	錆	鮫	皿	晒	三	傘	参	山	惨	撒	散	桟
0	1	1	1	1	0	0	28	次	滋	治	爾	璽	痔	磁	示	而	耳	自	蒔	辞	汐	鹿	式	識	鴫	竺	軸	宍	雫	七
0	1	1	1	1	0	1	29	宗	就	州	修	愁	拾	洲	秀	秋	終	繍	習	臭	舟	蒐	衆	襲	讐	蹴	輯	週	酋	酬
0	1	1	1	1	1	0	30	勝	匠	升	召	哨	商	唱	嘗	奨	妾	娼	宵	将	小	少	尚	庄	床	廠	彰	承	抄	招
0	1	1	1	1	1	1	31	拭	植	殖	燭	織	職	色	触	食	蝕	辱	尻	伸	信	侵	唇	娠	寝	審	心	慎	振	新

Figure 54(a)

Figure 54 Japanese 2-byte Character Set

Includes: 51 General Graphic Characters
10 Digits
169 Hiragana and Katakana Characters
2965 Kanji Characters, level 1 of JIS C 6226-1983

Second Byte 第2バイト																										
b7	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b6	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b5	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b4	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
b3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	1	1
b2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	1	1
b1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

First Byte 第1バイト

b7	b6	b5	b4	b3	b2	b1	区 \ 点	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
0	1	0	0	0	0	1	1	全	々	〆	〇	ー	―	・	／	＼			｜	…	‥	‘	’	“	”	（	）			〔	〕
0	1	0	0	0	1	0	2																								
0	1	0	0	0	1	1	3	8	9																						
0	1	0	0	1	0	0	4	じ	す	ず	せ	ぜ	そ	ぞ	た	だ	ち	ぢ	っ	つ	づ	て	で	と	ど	な	に	ぬ	ね	の	は
0	1	0	0	1	0	1	5	ジ	ス	ズ	セ	ゼ	ソ	ゾ	タ	ダ	チ	ヂ	ッ	ツ	ヅ	テ	デ	ト	ド	ナ	ニ	ヌ	ネ	ノ	ハ
0	1	1	0	0	0	0	16	宛	姐	虻	飴	絢	綾	鮎	或	粟	袷	安	庵	按	暗	案	闇	鞍	杏	以	伊	位	依	偉	囲
0	1	1	0	0	0	1	17	姥	厩	浦	瓜	閏	噂	云	運	雲	荏	餌	叡	営	嬰	影	映	曳	栄	永	泳	洩	瑛	盈	穎
0	1	1	0	0	1	0	18	恩	温	穏	音	下	化	仮	何	伽	価	佳	加	可	嘉	夏	嫁	家	寡	科	暇	果	架	歌	河
	1	1	0	0	1	1	19	蓋	街	該	鎧	骸	浬	馨	蛙	垣	柿	蛎	鈎	劃	嚇	各	廓	拡	撹	格	核	殻	獲	確	穫
0	1	1	0	1	0	0	20	覚	喚	堪	柑	桓	棺	款	歓	汗	漢	澗	灌	環	甘	監	看	竿	管	簡	緩	缶	翰	肝	艦
0	1	1	0	1	0	1	21	妓	宜	戯	技	擬	欺	犠	疑	祇	義	蟻	誼	議	掬	菊	鞠	吉	吃	喫	桔	橘	詰	砧	杵
0	1	1	0	1	1	0	22	狂	狭	矯	胸	脅	興	蕎	郷	鏡	響	饗	驚	仰	凝	尭	暁	業	局	曲	極	玉	桐	粁	僅
0	1	1	0	1	1	1	23	係	傾	刑	兄	啓	圭	珪	型	契	形	径	恵	慶	慧	憩	掲	携	敬	景	桂	渓	畦	稽	系
0	1	1	1	0	0	0	24	幻	弦	減	源	玄	現	絃	舷	言	諺	限	乎	個	古	呼	固	姑	孤	己	庫	弧	戸	故	枯
0	1	1	1	0	0	1	25	皇	更	杭	校	梗	構	江	洪	浩	港	溝	甲	皇	硬	稿	糠	紅	紘	絞	綱	耕	考	肯	肱
0	1	1	1	0	1	0	26	左	差	査	沙	瑳	砂	詐	鎖	裟	坐	座	挫	債	催	再	最	哉	塞	妻	宰	彩	才	採	栽
0	1	1	1	0	1	1	27	燦	珊	産	算	纂	蚕	讃	賛	酸	餐	斬	暫	残	仕	仔	伺	使	刺	司	史	嗣	四	士	始
0	1	1	1	1	0	0	28	叱	執	失	嫉	室	悉	湿	漆	疾	質	実	蔀	篠	偲	柴	芝	屡	蕊	縞	舎	写	射	捨	赦
0	1	1	1	1	0	1	29	集	醜	什	住	充	十	従	戎	柔	汁	渋	獣	縦	重	銃	叔	夙	宿	淑	祝	縮	粛	塾	熟
0	1	1	1	1	1	0	30	掌	捷	昇	晶	昭	晶	松	梢	樟	樵	沼	消	渉	湘	焼	焦	照	症	省	硝	礁	祥	称	章
0	1	1	1	1	1	1	31	青	森	榛	浸	深	申	疹	真	神	秦	紳	臣	芯	新	親	診	身	辛	進	針	震	人	仁	刃

Figure 54(b)

Second Byte 第2バイト

First Byte 第1バイト

b7	b6	b5	b4	b3	b2	b1		48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
							b7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
							b5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
							b4	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
							b3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
							b2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
							b1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b7	b6	b5	b4	b3	b2	b1	区 \ 点	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
0	1	0	0	0	0	1	1			〈	〉									＋	－	±	×	÷	＝						
0	1	0	0	0	1	0	2																								
0	1	0	0	0	1	1	3																								
0	1	0	0	1	0	0	4	ば	ぱ	ひ	び	ぴ	ふ	ぶ	ぷ	へ	べ	ぺ	ほ	ぼ	ぽ	ま	み	む	め	も	ゃ	や	ゅ	ゆ	ょ
0	1	0	0	1	0	1	5	バ	パ	ヒ	ビ	ピ	フ	ブ	プ	ヘ	ベ	ペ	ホ	ボ	ポ	マ	ミ	ム	メ	モ	ャ	ヤ	ュ	ユ	ョ
0	1	1	0	0	0	0	16	夷	委	威	尉	惟	意	慰	易	椅	為	畏	異	移	維	緯	胃	萎	衣	謂	違	遺	医	井	亥
0	1	1	0	0	0	1	17	頴	英	衛	詠	鋭	液	疫	益	駅	悦	謁	越	閲	榎	厭	円	園	堰	奄	宴	延	怨	掩	援
0	1	1	0	0	1	0	18	火	珂	禍	禾	稼	箇	花	苛	茄	荷	華	菓	蝦	課	嘩	貨	迦	過	霞	蚊	俄	峨	我	牙
0	1	1	0	0	1	1	19	覚	角	赫	較	郭	閣	隔	革	学	岳	楽	額	顎	掛	笠	樫	橿	梶	鰍	潟	割	喝	恰	括
0	1	1	0	1	0	0	20	莞	観	諌	貫	還	鑑	間	閑	関	陥	韓	館	舘	丸	含	岸	巌	玩	癌	眼	岩	翫	贋	雁
0	1	1	0	1	0	1	21	黍	却	客	脚	虐	逆	丘	久	仇	休	及	吸	宮	弓	急	救	朽	求	汲	泣	灸	球	究	窮
0	1	1	0	1	1	0	22	勤	均	巾	錦	斤	欣	欽	琴	禁	禽	筋	緊	芹	菌	衿	襟	謹	近	金	吟	銀	九	倶	句
0	1	1	0	1	1	1	23	経	継	繋	罫	茎	荊	蛍	計	詣	警	軽	頚	鶏	芸	迎	鯨	劇	戟	撃	激	隙	桁	傑	欠
0	1	1	1	0	0	0	24	湖	狐	糊	袴	股	胡	菰	虎	誇	跨	鈷	雇	顧	鼓	五	互	伍	午	呉	吾	娯	後	御	悟
0	1	1	1	0	0	1	25	腔	膏	航	荒	行	衡	講	貢	購	郊	酵	鉱	砿	鋼	閤	降	項	香	高	鴻	剛	劫	号	合
0	1	1	1	0	1	0	26	歳	済	災	采	犀	砕	砦	祭	斎	細	菜	裁	載	際	剤	在	材	罪	財	冴	坂	阪	堺	榊
0	1	1	1	0	1	1	27	姉	姿	子	屍	市	師	志	思	指	支	孜	斯	施	旨	枝	止	死	氏	獅	祉	私	糸	紙	紫
0	1	1	1	1	0	0	28	斜	煮	社	紗	者	謝	車	遮	蛇	邪	借	勺	尺	杓	灼	爵	酌	釈	錫	若	寂	弱	惹	主
0	1	1	1	1	0	1	29	出	術	述	俊	峻	春	瞬	竣	舜	駿	准	循	旬	楯	殉	淳	準	潤	盾	純	巡	遵	醇	順
0	1	1	1	1	1	0	30	笑	粧	紹	肖	菖	蒋	蕉	衝	裳	訟	証	詔	詳	象	賞	醤	鉦	鍾	鐘	障	鞘	上	丈	丞
0	1	1	1	1	1	1	31	塵	壬	尋	甚	尽	腎	訊	迅	陣	靭	笥	諏	須	酢	図	厨	逗	吹	垂	帥	推	水	炊	睡

Figure 54(c)

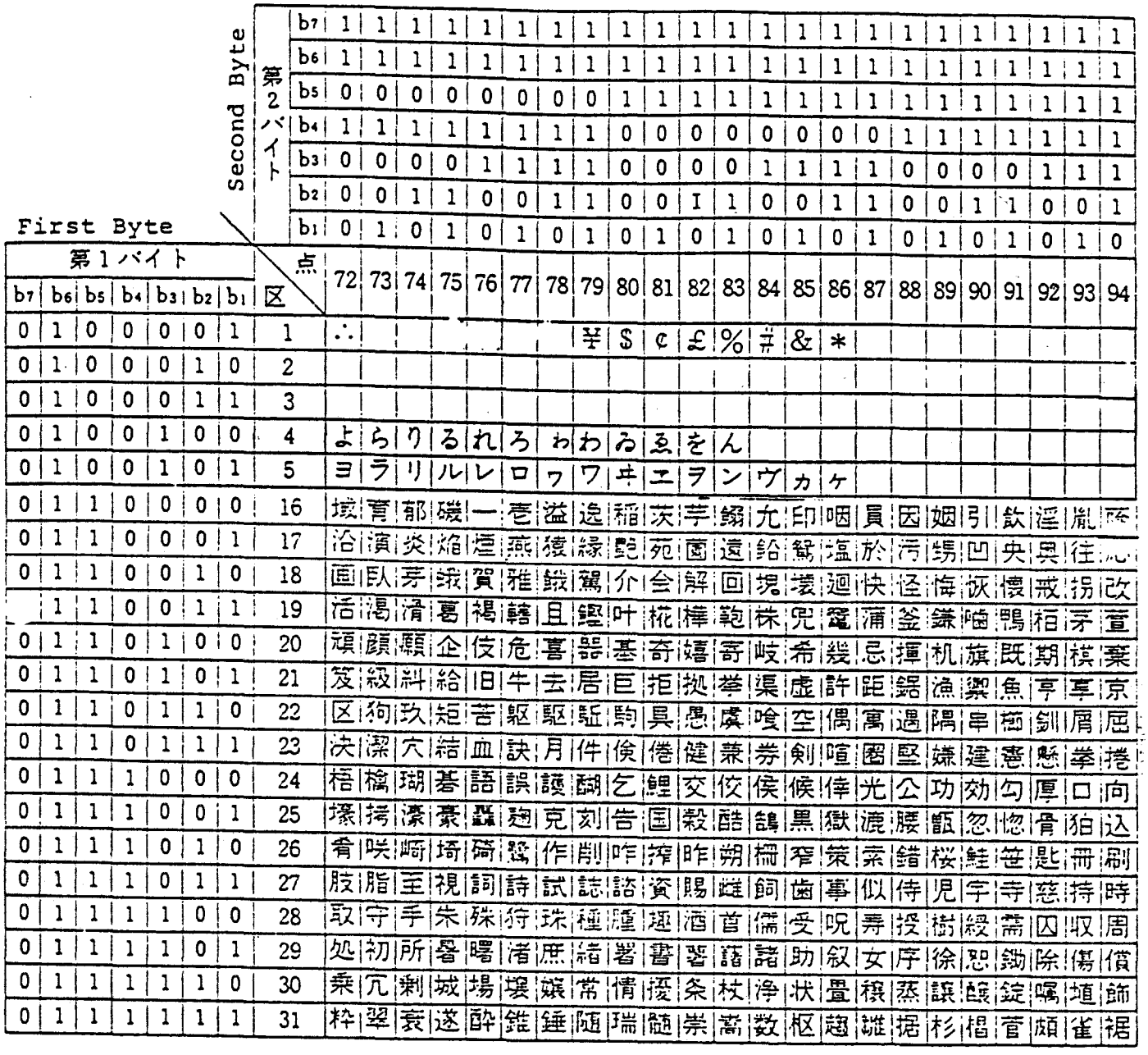


Figure 54(d)

							Second Byte 第2バイト																						
							b7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
							b6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
							b4	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
							b3	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
							b2	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
First Byte							b1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
第1バイト							点																							
b7	b6	b5	b4	b3	b2	b1	区	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1	0	0	0	0	0	0	32	澄	摺	寸	世	瀬	畝	是	凄	制	勢	姓	征	性	成	政	整	星	晴	棲	栖	正	清	牲
1	0	0	0	0	0	1	33	繊	羨	腺	舛	船	薦	詮	賎	践	選	遷	銭	銑	閃	鮮	前	善	漸	然	全	禅	繕	膳
1	0	0	0	0	1	0	34	糎	蔵	贈	造	促	側	則	即	息	捉	束	測	足	速	俗	属	賊	族	続	卒	袖	其	揃
1	0	0	0	0	1	1	35	叩	但	達	辰	奪	脱	巽	竪	辿	棚	谷	狸	鱈	樽	誰	丹	単	嘆	坦	担	探	旦	歎
1	0	0	0	1	0	0	36	帖	帳	庁	弔	張	彫	徴	懲	挑	暢	朝	潮	牒	町	眺	聴	脹	腸	蝶	調	諜	超	跳
1	0	0	0	1	0	1	37	邸	鄭	釘	鼎	泥	摘	擢	敵	滴	的	笛	適	鏑	溺	哲	徹	撤	轍	迭	鉄	典	填	天
1	0	0	0	1	1	0	38	董	蕩	藤	討	謄	豆	踏	逃	透	鐙	陶	頭	騰	闘	働	動	同	堂	導	憧	撞	洞	瞳
1	0	0	0	1	1	1	39	如	尿	韮	任	妊	忍	認	濡	禰	祢	寧	葱	猫	熱	年	念	捻	撚	燃	粘	乃	廼	之
1	0	0	1	0	0	0	40	函	箱	硲	箸	肇	筈	櫨	幡	肌	畑	畠	八	鉢	溌	発	醗	髪	伐	罰	抜	筏	閥	鳩
1	0	0	1	0	0	1	41	鼻	柊	稗	匹	疋	髭	彦	膝	菱	肘	弼	必	畢	筆	逼	桧	姫	媛	紐	百	謬	俵	彪
1	0	0	1	0	1	0	42	福	腹	複	覆	淵	弗	払	沸	仏	物	鮒	分	吻	噴	墳	憤	扮	焚	奮	粉	糞	紛	雰
1	0	0	1	0	1	1	43	法	泡	烹	砲	縫	胞	芳	萌	蓬	蜂	褒	訪	豊	邦	鋒	飽	鳳	鵬	乏	亡	傍	剖	坊
1	0	0	1	1	0	0	44	漫	蔓	味	未	魅	巳	箕	岬	密	蜜	湊	蓑	稔	脈	妙	粍	民	眠	務	夢	無	牟	矛
1	0	0	1	1	0	1	45	諭	輸	唯	佑	優	勇	友	宥	幽	悠	憂	揖	有	柚	湧	涌	猶	猷	由	祐	裕	誘	遊
1	0	0	1	1	1	0	46	痢	裏	裡	里	離	陸	律	率	立	葎	掠	略	劉	流	溜	琉	留	硫	粒	隆	竜	龍	侶
1	0	0	1	1	1	1	47	漣	連	錬	呂	魯	櫓	炉	賂	路	露	労	婁	廊	弄	朗	楼	榔	浪	漏	牢	狼	篭	老

Figure 54(e)

Second Byte 第2バイト																								
b7	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b6	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b5	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b4	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
b3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
b2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
b1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

First Byte

第1バイト							点																		
b7	b6	b5	b4	b3	b2	b1	区	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
1	0	0	0	0	0	0	32	生	盛	精	聖	声	製	西	誠	誓	請	逝	醒	青	静	斉	税	隻	隻	席	惜	戚	斥	昔	析
1	0	0	0	0	0	1	33	糧	噌	塑	岨	措	曾	曽	楚	狙	疏	踈	礎	祖	租	粗	素	組	蘇	訴	阻	遡	鼠	僧	創
1	0	0	0	0	1	0	34	存	孫	尊	損	村	遜	他	多	太	汰	詑	唾	堕	妥	惰	打	柁	舵	楕	陀	駄	騨	体	堆
1	0	0	0	0	1	1	35	淡	湛	炭	短	端	箪	綻	耽	胆	蛋	誕	鍛	団	壇	弾	断	暖	檀	段	男	談	値	知	地
1	0	0	0	1	0	0	36	銚	長	頂	鳥	勅	捗	直	朕	沈	珍	賃	鎮	陳	津	墜	椎	槌	追	鎚	痛	通	塚	栂	掴
1	0	0	0	1	0	1	37	展	店	添	纏	甜	貼	転	顛	点	伝	殿	澱	田	電	兎	吐	堵	塗	妬	屠	徒	斗	杜	渡
1	0	0	0	1	1	0	38	登	胴	蜀	道	銅	峠	鴇	匿	得	徳	涜	特	督	禿	篤	毒	独	読	栃	橡	凸	突	椴	届
1	0	0	0	1	1	1	39	苳	蓑	悩	濃	納	能	脳	膿	農	覗	蚤	巴	把	播	覇	杷	波	派	琶	破	婆	罵	芭	馬
0	0	0	1	0	0	0	40	噺	塙	蛤	隼	伴	判	半	反	叛	帆	搬	斑	板	氾	汎	版	犯	班	畔	繁	般	藩	販	範
1	0	0	1	0	0	1	41	標	氷	漂	瓢	票	表	評	豹	廟	描	病	秒	苗	錨	鋲	蒜	蛭	鐙	品	彬	斌	浜	瀕	貧
1	0	0	1	0	1	0	42	文	閊	丙	併	兵	塀	幣	平	弊	柄	並	蔽	閉	陛	米	頁	僻	壁	癖	碧	別	瞥	蔑	箆
1	0	0	1	0	1	1	43	妨	帽	忘	忙	房	暴	望	某	棒	冒	紡	肪	膨	謀	貌	貿	鉾	防	吠	頬	北	僕	卜	墨
1	0	0	1	1	0	0	44	霧	鵡	椋	婿	娘	冥	名	命	明	盟	迷	銘	鳴	姪	牝	滅	免	棉	綿	緬	面	麺	摸	模
1	0	0	1	1	0	1	45	邑	郵	雄	融	夕	予	余	与	誉	輿	預	傭	幼	妖	容	庸	揚	揺	擁	曜	楊	様	洋	溶
1	0	0	1	1	1	0	46	慮	旅	虜	了	亮	僚	両	凌	寮	料	梁	涼	猟	療	瞭	稜	糧	良	諒	遼	量	陵	領	力
1	0	0	1	1	1	1	47	隣	蛍	郎	六	麓	禄	肋	録	論	倭	和	話	歪	賄	脇	惑	枠	鷲	亙	亘	鰐	詫	藁	蕨

Figure 54(f)

Second Byte 第2バイト																								
b7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
b5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
b4	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
b3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
b2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
b1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1

First Byte

第1バイト							点																		
b7	b6	b5	b4	b3	b2	b1	区	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
1	0	0	0	0	0	0	32	石	積	籍	績	脊	責	赤	跡	蹟	碩	切	拙	接	摂	折	設	窃	節	説	雪	絶	舌	蝉	仙
1	0	0	0	0	0	1	33	双	葬	倉	喪	壮	奏	爽	宋	層	匝	惣	想	捜	掃	挿	掻	操	早	曹	巣	槍	槽	漕	燥
1	0	0	0	0	1	0	34	対	耐	岱	帯	待	怠	態	戴	替	泰	滞	胎	腿	苔	袋	貸	退	逮	隊	黛	鯛	代	台	大
1	0	0	0	0	1	1	35	弛	恥	智	池	痴	稚	置	致	蜘	遅	馳	築	畜	竹	筑	蓄	逐	秩	窒	茶	嫡	着	中	仲
1	0	0	0	1	0	0	36	衷	但	漬	柝	辻	鳶	級	鍔	椿	潰	坪	壷	嬬	紬	爪	吊	釣	鶴	亭	低	停	偵	剃	貞
1	0	0	0	1	0	1	37	登	菟	賭	途	都	鍍	砥	砺	努	度	土	奴	怒	倒	党	冬	凍	刀	唐	塔	塘	套	宕	島
1	0	0	0	1	1	0	38	嵩	苫	寅	酉	瀞	噸	屯	惇	敦	沌	豚	遁	頓	呑	曇	鈍	奈	那	内	乍	凪	薙	謎	灘
1	0	0	0	1	1	1	39	俳	廃	拝	排	敗	杯	盃	牌	背	肺	闇	配	倍	培	媒	梅	楳	煤	狽	買	売	賠	陪	這
1	0	0	1	0	0	0	40	采	煩	頒	飯	挽	晩	番	盤	磐	蕃	蛮	匪	卑	否	妃	庇	彼	悲	扉	批	披	斐	比	泌
1	0	0	1	0	0	1	41	賓	頻	敏	瓶	不	付	埠	夫	婦	富	冨	布	府	怖	扶	敷	斧	普	浮	父	符	腐	膚	芙
1	0	0	1	0	1	0	42	偏	変	片	篇	編	辺	返	遍	便	勉	娩	弁	鞭	保	舗	鋪	圃	捕	歩	甫	補	輔	穂	募
1	0	0	1	0	1	1	43	墓	朴	牧	睦	穆	釦	勃	没	殆	堀	幌	奔	本	翻	凡	盆	摩	磨	魔	麻	埋	妹	昧	枚
1	0	0	1	1	0	0	44	茂	妄	盲	毛	猛	盲	網	耗	蒙	儲	木	黙	目	杢	勿	餅	尤	戻	籾	貰	問	悶	紋	門
1	0	0	1	1	0	1	45	冶	用	窯	羊	耀	葉	蓉	要	謡	踊	遥	陽	養	慾	抑	欲	沃	浴	翌	翼	淀	羅	螺	裸
1	0	0	1	1	1	0	46	緑	倫	厘	林	淋	燐	琳	臨	輪	隣	鱗	瑠	塁	涙	累	類	令	伶	例	冷	励	嶺	怜	玲
1	0	0	1	1	1	1	47	椀	湾	碗	腕																				

Figure 54(g)

Second Byte 第2バイト

First Byte 第1バイト

b7	b6	b5	b4	b3	b2	b1	点 / 区	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
							b7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b5	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b4	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
							b3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1
							b2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1
							b1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
1	0	0	0	0	0	0	32	先	千	占	宣	専	尖	川	戦	扇	撰	栓	栴	泉	浅	洗	染	潜	煎	煽	旋	穿	箭	線
1	0	0	0	0	0	1	33	争	痩	相	窓	糟	総	綜	聡	草	荘	葬	蒼	藻	装	走	送	遭	鎗	霜	騒	像	増	憎
1	0	0	0	0	1	0	34	第	醍	題	鷹	滝	瀧	卓	啄	宅	托	択	拓	沢	濯	琢	託	鐸	濁	諾	茸	凧	蛸	只
1	0	0	0	0	1	1	35	宙	忠	抽	昼	柱	注	虫	衷	註	酎	鋳	駐	樗	瀦	猪	苧	著	貯	丁	兆	凋	喋	寵
1	0	0	0	1	0	0	36	呈	堤	定	帝	底	庭	廷	弟	悌	抵	挺	提	梯	汀	碇	禎	程	締	艇	訂	諦	蹄	逓
1	0	0	0	1	0	1	37	嶋	悼	投	搭	東	桃	梼	棟	盗	淘	湯	涛	灯	燈	当	痘	祷	等	答	筒	糖	統	到
1	0	0	0	1	1	0	38	捺	鍋	楢	馴	縄	畷	南	楠	軟	難	汝	二	尼	弐	迩	匂	賑	肉	虹	廿	日	乳	入
1	0	0	0	1	1	1	39	鴫	秤	矧	萩	伯	剥	博	拍	柏	泊	白	箔	粕	舶	薄	迫	曝	漠	爆	縛	莫	駁	麦
1	0	0	1	0	0	0	40	疲	皮	碑	秘	緋	罷	肥	被	誹	費	避	非	飛	樋	簸	備	尾	微	枇	毘	琵	眉	美
1	0	0	1	0	0	1	41	譜	負	賦	赴	阜	附	侮	撫	武	舞	葡	蕪	部	封	楓	風	葺	蕗	伏	副	復	幅	服
1	0	0	1	0	1	0	42	墓	慕	戊	暮	母	簿	菩	倣	俸	包	呆	報	奉	宝	峰	峯	崩	庖	抱	捧	放	方	朋
1	0	0	1	0	1	1	43	毎	哩	槙	幕	膜	枕	鮪	柾	鱒	桝	亦	俣	又	抹	末	沫	迄	侭	繭	麿	万	慢	満
1	0	0	1	1	0	0	44	匁	也	冶	夜	爺	耶	野	弥	矢	厄	役	約	薬	訳	躍	靖	柳	薮	鑓	愉	愈	油	癒
1	0	0	1	1	0	1	45	来	莱	頼	雷	洛	絡	落	酪	乱	卵	嵐	欄	濫	藍	蘭	覧	利	吏	履	李	梨	理	璃
1	0	0	1	1	1	0	46	玲	礼	苓	鈴	隷	零	霊	麗	齢	暦	歴	列	劣	烈	裂	廉	恋	憐	漣	煉	簾	練	聯
1	0	0	1	1	1	1	47																							

Figure 54(h)

FIGURE 55 CHINESE 2-BYTE CHARACTER SET

EXPLANATORY NOTES

1. This is the character set of Chinese Standard GB 2312-80.

2. It includes the following 7445 characters:

2.1	202	General graphic characters
2.2	22	Arabic and Roman digits
2.3	60	Arabic and Chinese ordinal numbers
2.4	52	Capital and small letters of the latin alphabet
2.5	48	Capital and small letters of the Greek alphabet
2.6	66	Capital and small letters of the Cyrilic alphabet
2.7	169	Japanese hiragana and katakana syllabic characters
2.8	26	Chinese phonetic symbols
2.9	37	Chinese phonetic annotated letters
2.10	6763	Chinese ideographic characters

3. For particular applications a subset of the ideographic characters may be identified. Ideographic characters outside such a subset may be downloaded according to Section 14.12. Downloaded characters are not limited to those in item 2.10 above.

4. Some of the general graphic characters, numeric characters and the alphabetic characters required for a given page may be transmitted using single byte coding associated with other character sets of figure 14.

SECOND BYTE 第二字节																								
b_7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b_6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b_5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
b_4	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
b_3	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	1
b_2	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	1
b_1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	1
位	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	

FIRST BYTE 第一字节

b_7	b_6	b_5	b_4	b_3	b_2	b_1	区																	
0	1	0	0	0	0	1	1	SP	、	。	·	ˉ	ˇ	¨	〃	々	—	～	‖	…	‘	’	“	”	〔	〕	〈	〉	《	》
0	1	0	0	0	1	0	2																1.	2.	3.	4.	5.	6.	7.
0	1	0	0	0	1	1	3	!	"	#	¥	%	&	'	(	)	*	+	,	-	.	/	0	1	2	3	4	5	6	7
0	1	0	0	1	0	0	4	あ	あ	い	い	う	う	え	え	お	お	か	が	き	ぎ	く	ぐ	け	げ	こ	ご	さ	ざ	し
0	1	0	0	1	0	1	5	ア	ア	イ	イ	ウ	ウ	エ	エ	ォ	オ	カ	ガ	キ	ギ	ク	グ	ケ	ゲ	コ	ゴ	サ	ザ	シ
0	1	0	0	1	1	0	6	A	B	Γ	Δ	E	Z	H	Θ	I	K	Λ	M	N	Ξ	O	Π	P	Σ	T	Ⅰ	Φ	X	Ψ
0	1	0	0	1	1	1	7	А	Б	В	Г	Д	Е	Ё	Ж	З	И	Й	К	Л	М	Н	О	П	Р	С	Т	У	Х	Ф
0	1	0	1	0	0	0	8	ā	á	ǎ	à	ē	é	ě	è	ī	í	ǐ	ì	ō	ó	ǒ	ò	ū	ú	ǔ	ù	ǖ	ǘ	ǚ
0	1	0	1	0	0	1	9				─	━	│	┃	┄	┅	┆	┇	┈	┉	┊	┋	┌	┍	┎	┏	┐	┑	┒	┓
0	1	0	1	0	1	0	10																							
0	1	0	1	0	1	1	11																							
0	1	0	1	1	0	0	12																							
0	1	0	1	1	0	1	13																							
0	1	0	1	1	1	0	14																							
0	1	0	1	1	1	1	15																							
0	1	1	0	0	0	0	16	啊	阿	埃	挨	哎	唉	哀	皑	癌	蔼	矮	艾	碍	爱	隘	鞍	氨	安	俺	按	暗	岸	胺
0	1	1	0	0	0	1	17	薄	雹	保	堡	饱	宝	抱	报	暴	豹	鲍	爆	杯	碑	悲	卑	北	辈	背	贝	钡	倍	狈
0	1	1	0	0	1	0	18	病	并	玻	菠	播	拨	钵	波	博	勃	搏	铂	箔	伯	帛	舶	脖	膊	渤	泊	驳	捕	卜
0	1	1	0	0	1	1	19	场	尝	常	长	偿	肠	厂	敞	畅	唱	倡	超	抄	钞	朝	嘲	潮	巢	吵	炒	车	扯	撤
0	1	1	0	1	0	0	20	础	储	矗	搐	触	处	揣	川	穿	椽	传	船	喘	串	疮	窗	幢	床	闯	创	吹	炊	捶
0	1	1	0	1	0	1	21	怠	耽	担	丹	单	郸	掸	胆	旦	氮	但	惮	淡	诞	弹	蛋	当	挡	党	荡	档	刀	捣
0	1	1	0	1	1	0	22	丁	盯	叮	钉	顶	鼎	锭	定	订	丢	东	冬	董	懂	动	栋	侗	恫	冻	洞	兜	抖	斗
0	1	1	0	1	1	1	23	贰	发	罚	筏	伐	乏	阀	法	珐	藩	帆	番	翻	樊	矾	钒	繁	凡	烦	反	返	范	贩
0	1	1	1	0	0	0	24	浮	涪	福	袱	弗	甫	抚	辅	俯	釜	斧	脯	腑	府	腐	赴	副	覆	赋	复	傅	付	阜
0	1	1	1	0	0	1	25	埂	耿	梗	工	攻	功	恭	龚	供	躬	公	宫	弓	巩	汞	拱	贡	共	钩	勾	沟	苟	狗
0	1	1	1	0	1	0	26	骸	孩	海	氦	亥	害	骇	酣	憨	邯	韩	含	涵	寒	函	喊	罕	翰	撼	捍	旱	憾	悍
0	1	1	1	0	1	1	27	弧	虎	唬	护	互	沪	户	花	哗	华	猾	滑	画	划	化	话	槐	徊	怀	淮	坏	欢	环
0	1	1	1	1	0	0	28	肌	饥	迹	激	讥	鸡	姬	绩	缉	吉	极	棘	辑	籍	集	及	急	疾	汲	即	嫉	级	挤
0	1	1	1	1	0	1	29	健	舰	剑	饯	渐	溅	涧	建	僵	姜	将	浆	江	疆	蒋	桨	奖	讲	匠	酱	降	蕉	椒
0	1	1	1	1	1	0	30	尽	劲	荆	兢	茎	睛	晶	鲸	京	惊	精	粳	经	井	警	景	颈	静	境	敬	镜	径	痉
0	1	1	1	1	1	1	31	俊	竣	浚	郡	骏	喀	咖	卡	咯	开	揩	楷	凯	慨	刊	堪	勘	坎	砍	看	康	慷	糠

Figure 55(a)

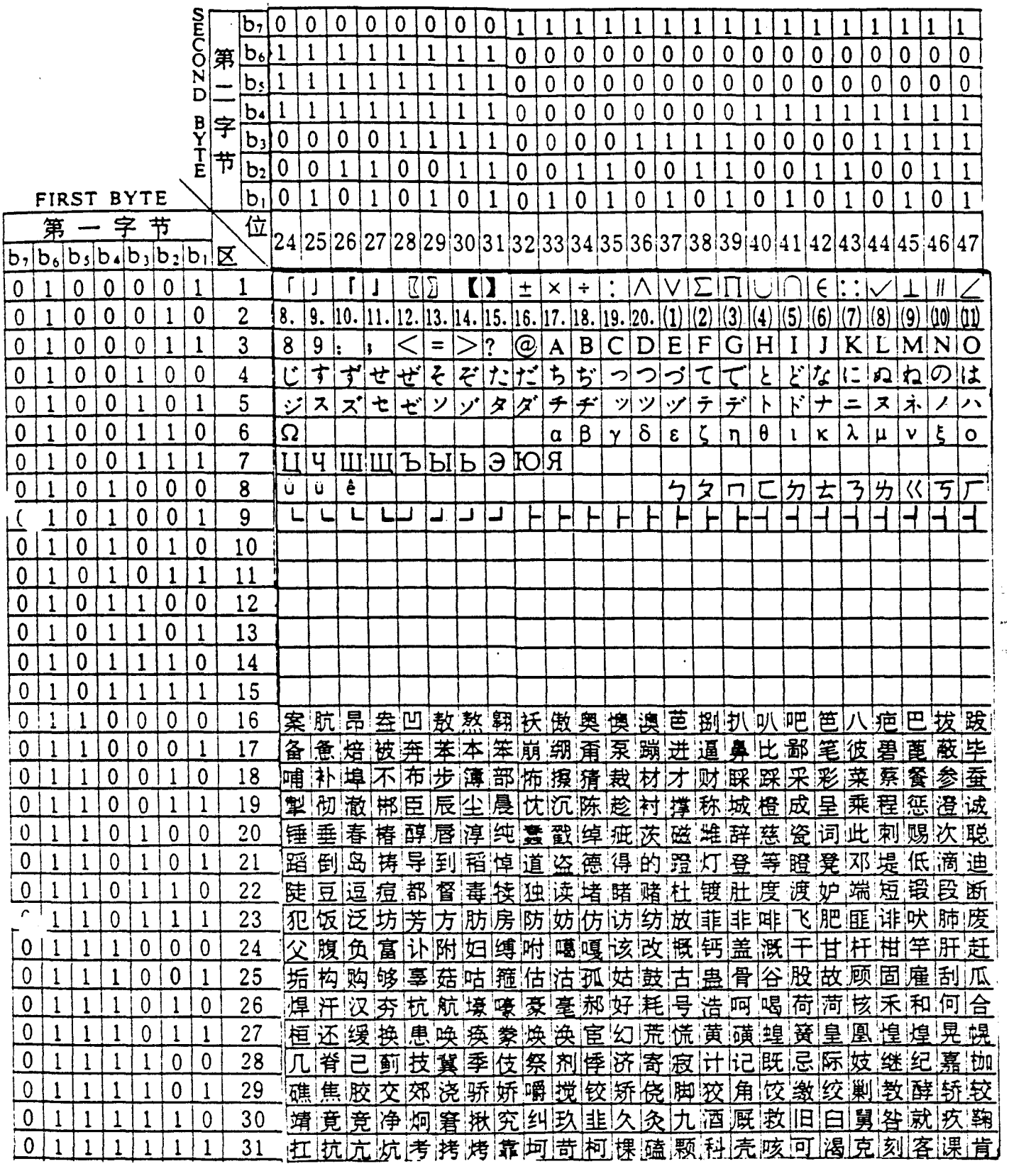


Figure 55(b)

SECOND BYTE 第二字节																									
b_7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b_6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b_5	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b_4	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1
b_3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	1
b_2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	1
b_1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0

FIRST BYTE 第一字节

b_7	b_6	b_5	b_4	b_3	b_2	b_1	区 / 位	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
0	1	0	0	0	0	1	1	㇀	㇁	£	‰	§	№	☆	★	○	●	◎	◇	◆	□	■	△	▲	※	→	←	↑	↓	〓
0	1	0	0	0	1	0	2	(四)	(五)	(六)	(七)	(八)	(九)	(十)			Ⅰ	Ⅱ	Ⅲ	Ⅳ	Ⅴ	Ⅵ	Ⅶ	Ⅷ	Ⅸ	Ⅹ	Ⅺ	Ⅻ		
0	1	0	0	0	1	1	3	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w	x	y	z	{	|	}	￣
0	1	0	0	1	0	0	4	よ	ら	り	る	れ	ろ	わ	わ	ゐ	ゑ	を	ん											
0	1	0	0	1	0	1	5	ヨ	ラ	リ	ル	レ	ロ	ヮ	ワ	ヰ	エ	ヲ	ン	ヴ	カ	ケ								
0	1	0	0	1	1	0	6																							
0	1	0	0	1	1	1	7	ц	ч	ш	щ	ъ	ы	ь	э	ю	я													
0	1	0	1	0	0	0	8	ㄨ	ㄩ																					
0	1	0	1	0	0	1	9	┼	┼	┼	┼	┼	┼	┼	┼															
0	1	0	1	0	1	0	10																							
0	1	0	1	0	1	1	11																							
0	1	0	1	1	0	0	12																							
0	1	0	1	1	0	1	13																							
0	1	0	1	1	1	0	14																							
0	1	0	1	1	1	1	15																							
0	1	1	0	0	0	0	16	拌	伴	瓣	半	办	绊	邦	帮	梆	榜	膀	绑	棒	磅	蚌	镑	傍	谤	苞	胞	包	褒	剥
0	1	1	0	0	0	1	17	辫	遍	标	彪	膘	表	鳖	憋	别	瘪	彬	斌	濒	滨	宾	摈	兵	冰	柄	丙	秉	饼	炳
0	1	1	0	0	1	0	18	茶	查	碴	搽	察	岔	差	诧	拆	柴	豺	搀	掺	蝉	谗	谗	缠	铲	产	阐	颤	昌	猖
0	1	1	0	0	1	1	19	宠	抽	酬	畴	踌	稠	愁	筹	仇	绸	瞅	丑	臭	初	出	橱	厨	躇	锄	雏	滁	除	楚
0	1	1	0	1	0	0	20	础	储	搐	措	挫	错	搭	达	答	瘩	打	大	呆	歹	傣	戴	带	殆	代	贷	袋	待	逮
0	1	1	0	1	0	1	21	佃	甸	店	惦	奠	淀	殿	碉	叼	雕	凋	刁	掉	吊	钓	调	跌	爹	碟	蝶	迭	谍	叠
0	1	1	0	1	1	0	22	惰	堕	蛾	峨	鹅	俄	额	讹	娥	恶	厄	扼	遏	鄂	饿	恩	而	儿	耳	尔	饵	洱	二
0	1	1	0	1	1	1	23	疯	烽	逢	冯	缝	讽	奉	凤	佛	否	夫	敷	肤	孵	扶	拂	辐	幅	氟	符	伏	俘	服
0	1	1	1	0	0	0	24	歌	搁	戈	鸽	胳	疙	割	革	葛	格	蛤	阁	隔	铬	个	各	给	根	跟	耕	更	庚	羹
0	1	1	1	0	0	1	25	硅	归	龟	闺	轨	鬼	诡	癸	桂	柜	跪	贵	刽	辊	滚	棍	锅	郭	国	果	裹	过	哈
0	1	1	1	0	1	0	26	鸿	洪	宏	弘	红	喉	侯	猴	吼	厚	候	后	呼	乎	忽	瑚	壶	葫	胡	蝴	狐	糊	湖
0	1	1	1	0	1	1	27	昏	婚	魂	浑	混	豁	活	伙	火	获	或	惑	霍	货	祸	击	圾	基	机	畸	稽	积	箕
0	1	1	1	1	0	0	28	艰	奸	缄	茧	检	柬	碱	硷	拣	捡	简	俭	剪	减	荐	槛	鉴	践	贱	见	键	箭	件
0	1	1	1	1	0	1	29	借	介	疥	诫	届	巾	筋	斤	金	今	津	襟	紧	锦	仅	谨	进	靳	晋	禁	近	烬	浸
0	1	1	1	1	1	0	30	捐	鹃	娟	倦	眷	卷	绢	撅	攫	抉	掘	倔	爵	觉	决	诀	绝	均	菌	钧	军	君	峻
0	1	1	1	1	1	1	31	胯	垮	筷	俭	快	宽	款	匡	筐	狂	框	矿	眶	旷	况	亏	盔	岿	窥	葵	奎	魁	傀

Figure 55(c)

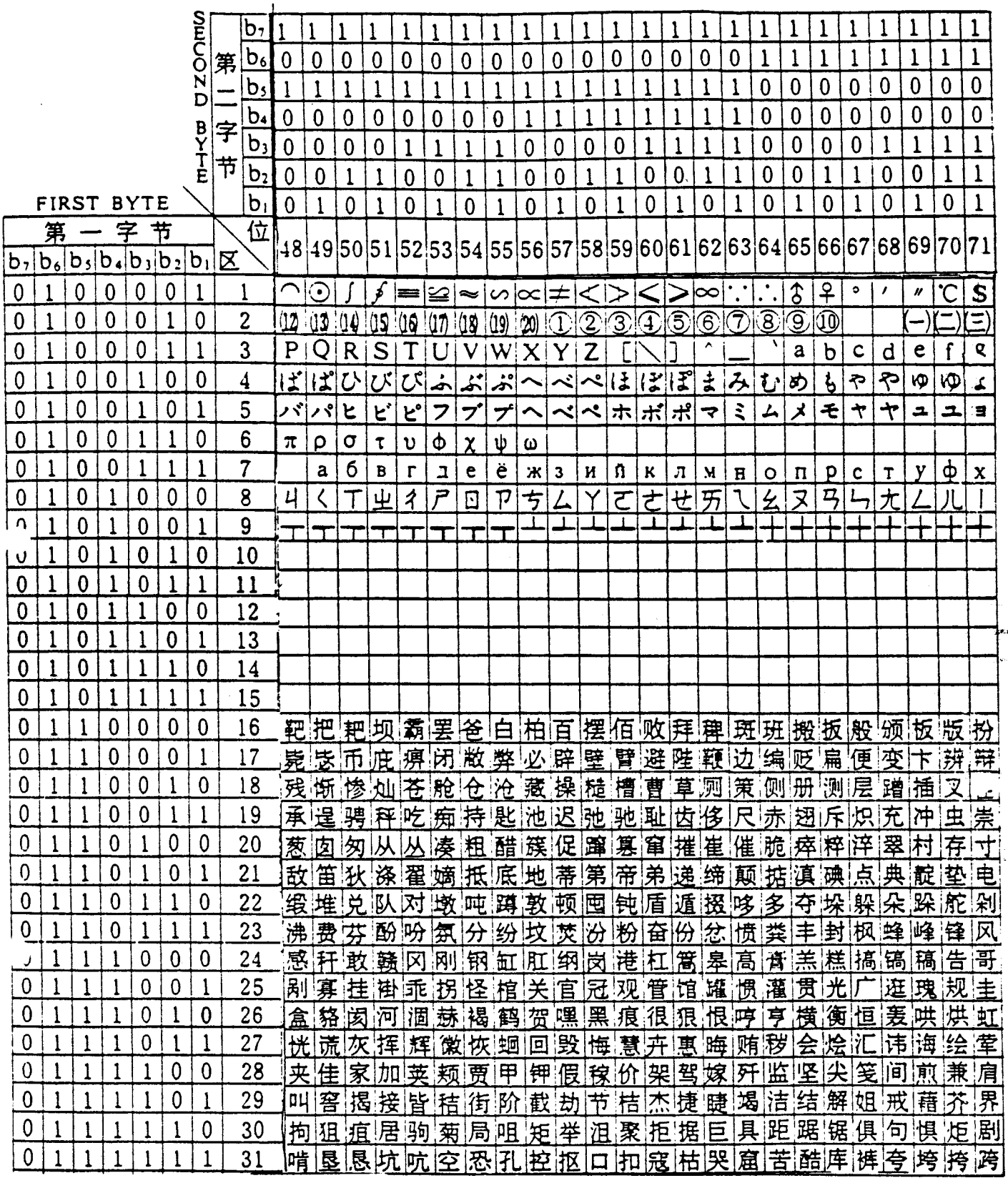


Figure 55(d)

FIRST BYTE 第一字节								SECOND BYTE 第二字节																
b_7	b_6	b_5	b_4	b_3	b_2	b_1		b_7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
								b_6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
								b_5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
								b_4	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0
								b_3	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1
								b_2	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0
								b_1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
							位		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
b_7	b_6	b_5	b_4	b_3	b_2	b_1	区																					
1	0	0	0	0	0	0	32		馈	愧	溃	坤	昆	捆	困	括	扩	廓	阔	垃	拉	喇	蜡	腊	辣	啦	莱	来
1	0	0	0	0	0	1	33		粮	立	粒	沥	隶	力	璃	哩	俩	联	莲	连	镰	廉	怜	涟	帘	敛	脸	链
1	0	0	0	0	1	0	34		隆	垄	拢	陇	楼	娄	搂	篓	漏	陋	芦	卢	颅	庐	炉	掳	卤	虏	鲁	麓
1	0	0	0	0	1	1	35		漫	芒	茫	盲	氓	忙	莽	猫	茅	锚	毛	矛	铆	卯	茂	冒	帽	貌	贸	么
1	0	0	0	1	0	0	36		幕	蓦	慕	膜	磨	摩	魔	抹	末	莫	墨	默	沫	漠	寞	陌	谋	牟	某	拇
1	0	0	0	1	0	1	37		拧	泞	牛	扭	钮	纽	脓	浓	农	弄	奴	努	怒	女	暖	虐	疟	挪	懦	糯
1	0	0	0	1	1	0	38		啤	脾	疲	皮	匹	痞	僻	屁	譬	篇	偏	片	骗	飘	漂	瓢	票	撇	瞥	拼
1	0	0	0	1	1	1	39		恰	洽	牵	扦	钎	铅	千	迁	签	仟	谦	乾	黔	钱	钳	前	潜	遣	浅	谴
1	0	0	1	0	0	0	40		取	娶	龋	趣	去	圈	颧	权	醛	泉	全	痊	拳	犬	券	劝	缺	炔	瘸	却
1	0	0	1	0	0	1	41		伞	散	桑	嗓	丧	搔	骚	扫	嫂	瑟	色	涩	森	僧	莎	砂	杀	刹	沙	纱
1	0	0	1	0	1	0	42		省	盛	剩	胜	圣	师	失	狮	施	湿	诗	尸	虱	十	石	拾	时	什	食	蚀
1	0	0	1	0	1	1	43		恕	刷	耍	摔	衰	甩	帅	栓	拴	霜	双	爽	谁	水	睡	税	吮	瞬	顺	舜
1	0	0	1	1	0	0	44		蒜	蒜	蹋	踏	胎	苔	抬	台	泰	酞	太	态	汰	坍	摊	贪	瘫	滩	坛	檀
1	0	0	1	1	0	1	45		汀	廷	停	亭	庭	挺	艇	通	桐	酮	瞳	同	铜	彤	童	桶	捅	筒	统	痛
1	0	0	1	1	1	0	46		巍	微	危	韦	违	桅	围	唯	惟	为	潍	维	苇	萎	委	伟	伪	尾	纬	未
1	0	0	1	1	1	1	47		稀	息	希	悉	膝	夕	惜	熄	烯	溪	汐	犀	檄	袭	席	习	媳	喜	铣	洗
1	0	1	0	0	0	0	48		小	孝	校	肖	啸	笑	效	楔	些	歇	蝎	鞋	协	挟	携	邪	斜	胁	谐	写
1	0	1	0	0	0	1	49		选	癣	眩	绚	靴	薛	学	穴	雪	血	勋	熏	循	旬	询	寻	驯	巡	殉	汛
1	0	1	0	0	1	0	50		摇	尧	遥	窑	谣	姚	咬	舀	药	要	耀	椰	噎	耶	爷	野	冶	也	页	掖
1	0	1	0	0	1	1	51		印	英	樱	婴	鹰	应	缨	莹	萤	营	荧	蝇	迎	赢	盈	影	颖	硬	映	哟
1	0	1	0	1	0	0	52		浴	寓	裕	预	豫	驭	鸳	渊	冤	元	垣	袁	原	援	辕	园	员	圆	猿	源
1	0	1	0	1	0	1	53		测	闸	眨	栅	榨	咋	乍	炸	诈	摘	斋	宅	窄	债	寨	瞻	毡	詹	粘	沾
1	0	1	0	1	1	0	54		帧	症	郑	证	芝	枝	支	吱	蜘	知	肢	脂	汁	之	织	职	直	植	殖	执
1	0	1	0	1	1	1	55		住	注	祝	驻	抓	爪	拽	专	砖	转	撰	赚	篆	桩	庄	装	妆	撞	壮	状
1	0	1	1	0	0	0	56		亍	丌	兀	丐	廿	卅	丕	亘	丞	鬲	孬	噩	丨	禺	丿	匕	乇	夭	爻	卮
1	0	1	1	0	0	1	57		佟	佗	伲	伽	佶	佴	侑	侉	侃	侏	佾	佻	侪	佼	侬	侔	俦	俨	俪	俣
1	0	1	1	0	1	0	58		淞	一	豕	寞	i	讦	讧	讪	讵	讹	讷	诂	诃	诋	诏	诎	诒	诓	诔	诖
1	0	1	1	0	1	1	59		邸	邰	郏	郅	邮	郁	郄	郇	郓	郦	郜	郗	郐	郁	郛	郫	郯	郴	郸	都
1	0	1	1	1	0	0	60		堋	堍	埽	埭	堀	堞	堙	塄	埘	埙	塬	堰	墁	墉	墚	墀	馨	鼙	懿	艹
1	0	1	1	1	0	1	61		荨	茛	荞	荚	荪	荬	荑	荻	荸	莳	莴	莠	莪	莓	莜	莅	荼	莶	莩	荽
1	0	1	1	1	1	0	62		菄	菟	萏	萝	蕙	蓼	蕖	蕤	蕞	蕺	瞢	蕃	蘅	蕨	蕖	薇	薏	蕲	薮	薛
1	0	1	1	1	1	1	63		擂	攒	撸	撙	撺	擀	擐	擗	擤	擂	攉	攝	攒	弋	忒	甙	弒	叭	叱	叽

Figure 55(e)

FIRST BYTE 第一字节							SECOND BYTE 第二字节																								
							b7	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b6	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
							b5	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
							b4	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
							b3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
							b2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
							b1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
b7	b6	b5	b4	b3	b2	b1	区 \ 位	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
1	0	0	0	0	0	0	32	栏	拦	篮	阑	兰	澜	谰	揽	览	懒	缆	烂	滥	琅	榔	狼	廊	郎	朗	浪	捞	劳	牢	老
1	0	0	0	0	0	1	33	粮	凉	梁	粱	良	两	辆	量	晾	亮	谅	撩	聊	僚	疗	燎	寥	辽	潦	了	撂	镣	廖	料
1	0	0	0	0	1	0	34	赂	鹿	潞	禄	录	陆	戮	驴	吕	铝	侣	旅	履	屡	缕	虑	氯	律	率	滤	绿	峦	挛	孪
1	0	0	0	0	1	1	35	酶	霉	煤	没	眉	媒	镁	每	美	昧	寐	妹	媚	门	闷	们	萌	蒙	檬	盟	锰	猛	梦	孟
1	0	0	0	1	0	0	36	母	墓	暮	幕	募	慕	木	目	睦	牧	穆	拿	哪	呐	钠	那	娜	纳	氖	乃	奶	耐	奈	南
1	0	0	0	1	0	1	37	鸥	殴	藕	呕	偶	沤	啪	趴	爬	帕	怕	琶	拍	排	牌	徘	湃	派	攀	潘	盘	磐	盼	畔
1	0	0	0	1	1	0	38	聘	乒	坪	苹	萍	平	凭	瓶	评	屏	坡	泼	颇	婆	破	魄	迫	粕	剖	扑	铺	仆	莆	葡
1	0	0	0	1	1	1	39	歉	枪	呛	腔	羌	墙	蔷	强	抢	橇	锹	敲	悄	桥	瞧	乔	侨	巧	鞘	撬	翘	峭	俏	窍
1	0	0	1	0	0	0	40	雀	裙	群	然	燃	冉	染	瓤	壤	攘	嚷	让	饶	扰	绕	惹	热	壬	仁	人	忍	韧	任	认
1	0	0	1	0	0	1	41	筛	晒	珊	苫	杉	山	删	煽	衫	闪	陕	擅	赡	膳	善	汕	扇	缮	墒	伤	商	赏	晌	上
1	0	0	1	0	1	0	42	矢	使	屎	驶	始	式	示	士	世	柿	事	拭	誓	逝	势	是	嗜	噬	适	仕	侍	释	饰	氏
1	0	0	1	0	1	1	43	烁	斯	撕	嘶	思	私	司	丝	死	肆	寺	嗣	四	伺	似	饲	巳	松	耸	怂	颂	送	宋	讼
1	0	0	1	1	0	0	44	谈	坦	毯	袒	碳	探	叹	炭	汤	塘	搪	堂	棠	膛	唐	糖	倘	躺	淌	趟	烫	掏	涛	滔
1	0	0	1	1	0	1	45	透	凸	秃	突	图	徒	途	涂	屠	土	吐	兔	湍	团	推	颓	腿	蜕	褪	退	吞	屯	臀	拖
1	0	0	1	1	1	0	46	胃	喂	魏	位	渭	谓	尉	慰	卫	瘟	温	蚊	文	闻	纹	吻	稳	紊	问	嗡	翁	瓮	挝	蜗
1	0	0	1	1	1	1	47	细	瞎	虾	匣	霞	辖	暇	峡	侠	狭	下	厦	夏	吓	掀	锨	先	仙	鲜	纤	咸	贤	衔	舷
1	0	1	0	0	0	0	48	懈	泄	泻	谢	屑	薪	芯	锌	欣	辛	新	忻	心	信	衅	星	腥	猩	惺	兴	刑	型	形	邢
1	0	1	0	0	0	1	49	迅	压	押	鸦	鸭	呀	丫	芽	牙	蚜	崖	衙	涯	雅	哑	亚	讶	焉	咽	阉	烟	淹	盐	严
1	0	1	0	0	1	0	50	腋	夜	液	一	壹	医	揖	铱	依	伊	衣	颐	夷	遗	移	仪	胰	疑	沂	宜	姨	彝	椅	蚁
1	0	1	0	0	1	1	51	痈	庸	雍	踊	蛹	咏	泳	涌	永	恿	勇	用	幽	优	悠	忧	尤	由	邮	铀	犹	油	游	酉
1	0	1	0	1	0	0	52	愿	怨	院	曰	约	越	跃	钥	岳	粤	月	悦	阅	耘	云	郧	匀	陨	允	运	蕴	酝	晕	韵
1	0	1	0	1	0	1	53	崭	展	蘸	栈	占	战	站	湛	绽	樟	章	彰	漳	张	掌	涨	杖	丈	帐	账	仗	胀	瘴	障
1	0	1	0	1	1	0	54	指	止	趾	只	旨	纸	志	挚	掷	至	致	置	帜	峙	制	智	秩	稚	质	炙	痔	滞	治	窒
1	0	1	0	1	1	1	55	赘	坠	缀	谆	准	捉	拙	卓	桌	琢	茁	酌	啄	着	灼	浊	兹	咨	资	姿	滋	淄	孜	紫
1	0	1	1	0	0	0	56	馗	毓	睾	鼗	丶	亟	鼐	乜	乩	亓	芈	孛	啬	嘏	仄	厍	厝	厣	厥	厮	靥	赝	匚	叵
1	0	1	1	0	0	1	57	俑	俟	俸	倩	偌	俳	倬	倏	倮	倭	俾	倜	倌	倥	倨	偾	偃	偕	偈	偎	偬	偻	傥	傧
1	0	1	1	0	1	0	58	诟	诠	诤	诨	诩	诮	诰	诳	诶	诹	诼	诿	谀	谂	谄	谇	谌	谏	谑	谒	谔	谕	谖	谙
1	0	1	1	0	1	1	59	鄹	酃	酆	刍	奂	劢	劬	劭	劾	哿	勐	勖	勰	叟	燮	矍	廴	凵	凼	鬯	厶	弁	畚	巯
1	0	1	1	1	0	0	60	芨	芄	芎	芑	芗	芙	芫	芸	芾	芰	苈	苊	苣	芘	芷	芮	苋	苌	苁	芩	芴	芡	芪	芟
1	0	1	1	1	0	1	61	莞	莨	莺	莼	菁	萁	菥	菘	堇	萘	萋	菝	菽	菖	萜	萸	萑	萆	菔	菟	萏	萃	菸	菹
1	0	1	1	1	1	0	62	薷	薰	藓	藁	藜	藿	蘧	蘅	蘩	蘖	蘼	廾	弈	夼	奁	耷	奕	奚	奘	匏	尢	尥	尬	尴
1	0	1	1	1	1	1	63	吒	吖	吆	呋	呒	呓	呔	呖	呃	吡	呗	呙	吣	吲	咂	咔	呷	呱	呤	咚	咛	咄	呶	呦

Figure 55(f)

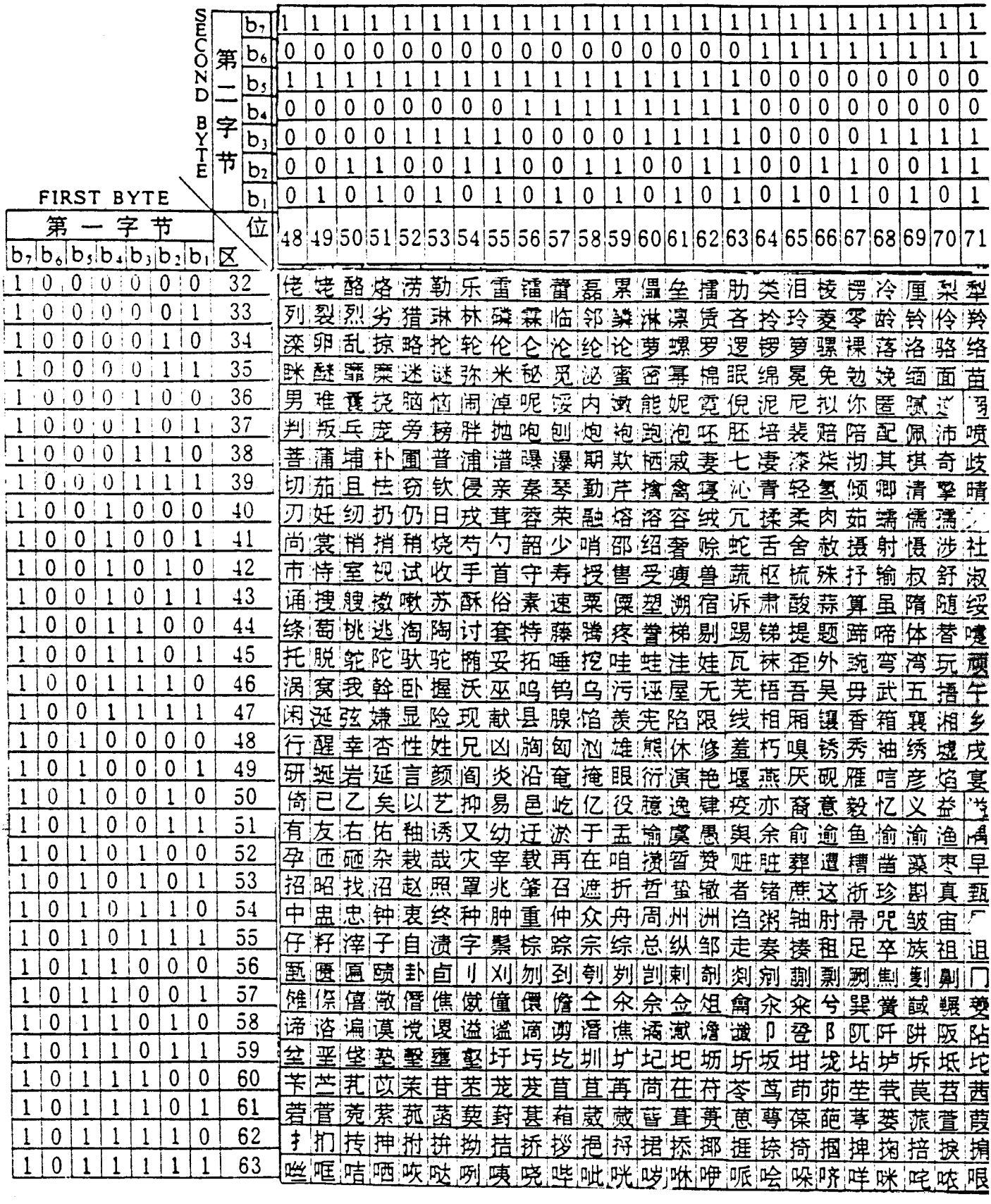


Figure 55(g)

SECOND BYTE 第二字节								72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
							b7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b5	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b4	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
							b3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1
							b2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1
FIRST BYTE 第一字节							b1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
b7	b6	b5	b4	b3	b2	b1	区 \ 位	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
1	0	0	0	0	0	0	32	黎	篱	狸	离	漓	理	李	里	鲤	礼	莉	荔	吏	栗	丽	厉	励	砾	历	利	傈	例	俐
1	0	0	0	0	0	1	33	凌	灵	陵	岭	领	另	令	溜	琉	榴	硫	馏	留	刘	瘤	流	柳	六	龙	聋	咙	笼	窿
1	0	0	0	0	1	0	34	妈	麻	玛	码	蚂	马	骂	嘛	吗	埋	买	麦	卖	迈	脉	瞒	馒	蛮	满	蔓	曼	慢	漫
1	0	0	0	0	1	1	35	描	瞄	藐	秒	渺	庙	妙	蔑	灭	民	抿	皿	敏	悯	闽	明	螟	鸣	铭	名	命	谬	摸
1	0	0	0	1	0	0	36	蔫	拈	年	碾	撵	捻	念	娘	酿	鸟	尿	捏	聂	孽	啮	镊	镍	涅	您	柠	狞	凝	宁
1	0	0	0	1	0	1	37	盆	砰	抨	烹	澎	彭	蓬	棚	硼	篷	膨	朋	鹏	捧	碰	坯	砒	霹	批	披	劈	琵	毗
1	0	0	0	1	1	0	38	畦	崎	脐	齐	旗	祈	祁	骑	起	岂	乞	企	启	契	砌	器	气	迄	弃	汽	泣	讫	掐
1	0	0	0	1	1	1	39	氰	情	顷	请	庆	琼	穷	秋	丘	邱	球	求	囚	酋	泅	趋	区	蛆	曲	躯	屈	驱	渠
	0	0	1	0	0	0	40	辱	乳	汝	入	褥	软	阮	蕊	瑞	锐	闰	润	若	弱	撒	洒	萨	腮	鳃	塞	赛	三	叁
1	0	0	1	0	0	1	41	设	砷	申	呻	伸	身	深	娠	绅	神	沈	审	婶	甚	肾	慎	渗	声	生	甥	牲	升	绳
1	0	0	1	0	1	0	42	疏	书	赎	孰	熟	薯	暑	曙	署	蜀	黍	鼠	属	术	述	树	束	戍	竖	墅	庶	数	漱
1	0	0	1	0	1	1	43	髓	碎	岁	穗	遂	隧	祟	孙	损	笋	蓑	梭	唆	缩	琐	索	锁	所	塌	他	它	她	塔
1	0	0	1	1	0	0	44	惕	涕	剃	屉	天	添	填	田	甜	恬	舔	腆	挑	条	迢	眺	跳	贴	铁	帖	厅	听	烃
1	0	0	1	1	0	1	45	丸	烷	完	碗	挽	晚	皖	惋	宛	婉	万	腕	汪	王	亡	枉	网	往	旺	望	忘	妄	威
1	0	0	1	1	1	0	46	舞	伍	侮	坞	戊	雾	晤	物	勿	务	悟	误	昔	熙	析	西	硒	矽	晰	嘻	吸	锡	牺
1	0	0	1	1	1	1	47	翔	祥	详	想	响	享	项	巷	橡	像	向	象	萧	硝	霄	削	哮	嚣	销	消	宵	淆	晓
1	0	1	0	0	0	0	48	需	虚	嘘	须	徐	许	蓄	酗	叙	旭	序	畜	恤	絮	婿	绪	续	轩	喧	宣	悬	旋	玄
1	0	1	0	0	0	1	49	谚	验	殃	央	鸯	秧	杨	扬	佯	疡	羊	洋	阳	氧	仰	痒	养	样	漾	邀	腰	妖	瑶
1	0	1	0	0	1	0	50	诣	议	谊	译	异	翼	翌	绎	茵	荫	因	殷	音	阴	姻	吟	银	淫	寅	饮	尹	引	隐
1	0	1	0	0	1	1	51	予	娱	雨	与	屿	禹	宇	语	羽	玉	域	芋	郁	吁	遇	喻	峪	御	愈	欲	狱	育	誉
1	0	1	0	1	0	0	52	澡	蚤	躁	噪	造	皂	灶	燥	责	择	则	泽	贼	怎	增	憎	曾	赠	扎	喳	渣	札	轧
1	0	1	0	1	0	1	53	砧	臻	贞	针	侦	枕	疹	诊	震	振	镇	阵	蒸	挣	睁	征	狰	争	怔	整	拯	正	政
	0	1	0	1	1	0	54	骤	珠	株	蛛	朱	猪	诸	诛	逐	竹	烛	煮	拄	瞩	嘱	主	著	柱	助	蛀	贮	铸	筑
1	0	1	0	1	1	1	55	阻	组	钻	纂	嘴	醉	最	罪	尊	遵	昨	左	佐	柞	做	作	坐	座					
1	0	1	1	0	0	0	56	罔	亻	仃	仉	仂	仨	仡	仫	仞	伛	仳	伢	佤	仵	伥	伧	伉	伫	佞	佧	攸	佚	佝
1	0	1	1	0	0	1	57	勹	匍	訇	匐	凫	夙	兕	亠	兖	亳	衮	袤	亵	脔	裒	禀	嬴	蠃	羸	冫	冱	冽	冼
1	0	1	1	0	1	0	58	阼	陂	陉	陔	陟	陧	陬	陲	陴	隈	隍	隗	隰	邗	邛	邝	邙	邬	邡	邴	邳	邶	邺
1	0	1	1	0	1	1	59	坭	坶	坳	垭	垤	垌	垲	埏	垧	垴	垓	垠	埕	埘	埚	埙	埒	垸	埴	埯	埸	埤	埝
1	0	1	1	1	0	0	60	萸	荛	荜	茈	莒	茼	茴	茱	莛	荞	茯	荏	荇	荃	荟	荀	茗	荠	茭	茺	茳	荦	荥
1	0	1	1	1	0	1	61	蕖	蓍	蓐	蓦	蒽	蓓	蓊	蒿	蒺	蓠	蒡	蒹	蒴	蒗	蓥	蓣	蔌	甍	蔸	蓰	蔹	蔟	蔺
1	0	1	1	1	1	0	62	掼	揲	揸	揠	揿	揄	揞	揎	摒	揆	掾	摅	摁	搋	搛	搠	搌	搦	搡	摞	撄	摭	撖
1	0	1	1	1	1	1	63	哞	唛	哧	唠	哽	唔	哳	唢	唣	唏	唑	唧	唪	啧	喏	喵	啉	啭	啁	啕	唿	啐	唼

Figure 55(h)

FIRST BYTE							SECOND BYTE 第二字节																							
							b7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
							b6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
							b4	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
							b3	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
							b2	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
							b1	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
第一字节							位	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
b7	b6	b5	b4	b3	b2	b1	区																							
1	1	0	0	0	0	0	64	唷	啖	啵	啶	唧	唳	唰	啜	喋	嗒	喃	喱	喹	喈	喁	喟	啾	嗖	喑	啻	嗟	喽	喾
1	1	0	0	0	0	1	65	帷	幄	幔	幛	幞	幡	岌	屺	岍	岐	岖	岈	岘	岙	岑	岚	岜	岵	岢	岽	岬	岫	岱
1	1	0	0	0	1	0	66	狻	猗	猓	猡	猊	猞	猝	猕	猢	猹	猥	猬	猸	猱	獐	獍	獗	獠	獬	獯	獾	舛	夥
1	1	0	0	0	1	1	67	恪	恽	悖	悚	悭	悝	悃	悒	悌	悛	惬	悻	悱	惝	惘	惆	惚	悴	愠	愦	愕	愣	惴
1	1	0	0	1	0	0	68	洹	洧	洌	浃	浈	洇	洄	洙	洎	洫	浍	洮	洵	洚	浏	浒	浔	洳	涑	浯	涞	涠	浞
1	1	0	0	1	0	1	69	濉	澧	澹	澶	濂	濡	濮	濞	濠	濯	瀚	瀣	瀛	瀹	瀵	灏	灞	宀	宄	宕	宓	宥	宸
1	1	0	0	1	1	0	70	妗	姊	妫	妞	妤	姒	妲	妯	姗	妾	娅	娆	姝	娈	姣	姘	姹	娌	娉	娲	娴	娑	娣
1	1	0	0	1	1	1	71	纭	纰	纾	绀	绁	绂	绉	绋	绌	绐	绔	绗	绛	绠	绡	绨	绫	绮	绯	绱	绲	缍	绶
1	1	0	1	0	0	0	72	琛	琚	瑁	瑜	瑗	瑕	瑙	瑷	瑭	瑾	璜	璎	璀	璁	璇	璋	璞	璨	璩	璐	璧	瓒	璺
1	1	0	1	0	0	1	73	椤	棰	椋	椁	楗	棣	椐	楱	椹	楠	楂	楝	榄	楫	榀	榘	楸	椴	槌	榇	榈	槎	榉
1	1	0	1	0	1	0	74	辍	辎	辏	辘	辚	軎	戋	戗	戛	戟	戢	戡	戥	戤	戬	臧	瓯	瓴	瓿	甏	甑	甓	攴
1	1	0	1	0	1	1	75	掰	擘	耄	毪	毳	毽	毵	毹	氅	氇	氆	氍	氕	氘	氙	氚	氡	氩	氤	氪	氲	攵	敕
1	1	0	1	1	0	0	76	臁	膦	欤	欷	欹	歃	歆	歙	飑	飒	飓	飕	飙	飚	殳	彀	毂	觳	斐	齑	斓	於	旆
1	1	0	1	1	0	1	77	怼	恝	恚	恧	恁	恙	恣	悫	愆	愍	慝	憩	憝	懋	懑	戆	肀	聿	沓	泶	淼	矶	矸
1	1	0	1	1	1	0	78	睢	睥	睿	瞍	睽	瞀	瞌	瞑	瞟	瞠	瞰	瞵	瞽	町	畀	畎	畋	畈	畛	畲	畹	疃	罘
1	1	0	1	1	1	1	79	铩	铫	铮	铯	铳	铴	铵	铷	铹	铼	铽	铿	锃	锂	锆	锇	锉	锊	锍	锎	锏	锒	锓
1	1	1	0	0	0	0	80	稹	稷	穑	黏	馥	穰	皈	皎	皓	皙	皤	瓞	瓠	甬	鸠	鸢	鸨	鸩	鸪	鸫	鸬	鸲	鸱
1	1	1	0	0	0	1	81	瘛	瘼	瘢	瘠	癀	瘭	瘰	瘿	瘵	癃	瘾	瘳	癍	癞	癔	癜	癖	癫	癯	翊	竦	穸	穹
1	1	1	0	0	1	0	82	颉	颌	颍	颏	颔	颚	颛	颞	颟	颡	颢	颥	颦	虍	虔	虬	虮	虿	虺	虼	虻	蚨	蚍
1	1	1	0	0	1	1	83	蟆	螈	螅	螭	螗	螃	螫	蟥	螬	螵	螳	蟋	蟓	螽	蟑	蟀	蟊	蟛	蟪	蟠	蟮	蠖	蠓
1	1	1	0	1	0	0	84	簟	簪	簦	簸	籁	籀	臾	舁	舂	舄	臬	衄	舡	舢	舣	舭	舯	舨	舫	舸	舻	舳	舴
1	1	1	0	1	0	1	85	酢	酡	酰	酩	酯	酽	酾	酲	酴	酹	醌	醅	醐	醍	醑	醢	醣	醪	醭	醮	醯	醵	醴
1	1	1	0	1	1	0	86	觥	觫	觯	訾	謦	靓	雩	雳	雯	霆	霁	霈	霏	霎	霪	霭	霰	霾	龀	龃	龅	龆	龇
1	1	1	0	1	1	1	87	鳌	鳍	鳎	鳏	鳐	鳓	鳔	鳕	鳗	鳘	鳙	鳜	鳝	鳟	鳢	靼	鞅	鞑	鞒	鞔	鞯	鞫	鞣
1	1	1	1	0	0	0	88																							
1	1	1	1	0	0	1	89																							
1	1	1	1	0	1	0	90																							
1	1	1	1	0	1	1	91																							
1	1	1	1	1	0	0	92																							
1	1	1	1	1	0	1	93																							
1	1	1	1	1	1	0	94																							

Figure 55(i)

FIRST BYTE 第一字节 b7	b6	b5	b4	b3	b2	b1	区 \ 位	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
							SECOND BYTE 第二字节 b7	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b6	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
							b5	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
							b4	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
							b3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
							b2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
							b1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
1	1	0	0	0	0	0	64	喔	喙	嗪	嗷	嗉	嘟	嗑	嗫	嗬	嗔	嗦	嗝	嗄	嗯	嗥	嗲	嗳	嗌	嗍	嗨	嗵	嗤	辔	嘞
1	1	0	0	0	0	1	65	岣	峁	岷	峄	峒	峤	峋	峥	崂	崃	崧	崦	崮	崤	崞	崆	崛	嵘	崾	崴	崽	嵬	嵛	嵯
1	1	0	0	0	1	0	66	飧	夤	夂	饣	饧	饨	饩	饪	饫	饬	饴	饷	饽	馀	馄	馇	馊	馍	馐	馑	馓	馔	馕	庀
1	1	0	0	0	1	1	67	愀	愎	愫	慊	慵	憬	憔	憧	憷	懔	懵	忝	隳	闩	闫	闱	闳	闵	闶	闼	闾	阃	阄	阆
1	1	0	0	1	0	0	68	涓	涔	浜	浠	浼	浣	渚	淇	淅	淞	渎	涿	淠	渑	淦	淝	淙	渖	涫	渌	涮	渫	湮	湎
1	1	0	0	1	0	1	69	甯	骞	搴	寤	寮	褰	寰	蹇	謇	辶	迓	迕	迥	迮	迤	迩	迦	迳	迨	逅	逄	逋	逦	逑
1	1	0	0	1	1	0	70	娓	婀	婧	婊	婕	娼	婢	婵	胬	媪	媛	婷	婺	媾	嫫	媲	嫒	嫔	媸	嫠	嫣	嫱	嫖	嫦
1	1	0	0	1	1	1	71	绺	绻	绾	缁	缂	缃	缇	缈	缋	缌	缏	缑	缒	缗	缙	缜	缛	缟	缡	缢	缣	缤	缥	缦
1	1	0	1	0	0	0	72	韪	韫	韬	杌	杓	杞	杈	杩	枥	枇	杪	杳	枘	枧	杵	枨	枞	枭	枋	杷	杼	柰	栉	柘
1	1	0	1	0	0	1	73	楦	楣	楹	榛	榧	榻	榫	榭	槔	榱	槁	槊	槟	榕	槠	榍	槿	樯	槭	樗	樘	橥	槲	橄
1	1	0	1	0	1	0	74	旮	旯	旰	昊	昙	杲	昃	昕	昀	炅	曷	昝	昴	昱	昶	昵	耆	晟	晔	晁	晏	晖	晡	晗
1	1	0	1	0	1	1	75	敫	牍	牒	牖	爰	虢	刖	肟	肜	肓	肼	朊	肽	肱	肫	肭	肴	肷	胧	胨	胩	胪	胛	胂
1	1	0	1	1	0	0	76	旄	旃	旌	旎	旒	旖	炀	炜	炖	炝	炻	烀	炷	炫	炱	烨	烊	焐	焓	焖	焯	焱	煳	煜
1	1	0	1	1	0	1	77	砀	砉	砗	砘	砑	斫	砭	砜	砝	砹	砺	砻	砟	砼	砥	砬	砣	砩	硎	硭	硖	硗	砦	硐
1	1	0	1	1	1	0	78	罘	罡	罟	詈	罨	罴	罱	罹	羁	罾	盍	盥	蠲	钅	钆	钇	钋	钊	钌	钍	钏	钐	钔	钗
1	1	0	1	1	1	1	79	锔	锕	锖	锘	锛	锝	锞	锟	锢	锪	锫	锩	锬	锱	锲	锴	锶	锷	锸	锼	锾	锿	镂	锵
1	1	1	0	0	0	0	80	鸶	鸸	鸷	鸹	鸺	鸾	鹁	鹂	鹄	鹆	鹇	鹈	鹉	鹋	鹌	鹎	鹑	鹕	鹗	鹚	鹛	鹜	鹞	鹣
1	1	1	0	0	0	1	81	窀	窆	窈	窕	窦	窠	窬	窨	窭	窳	衤	衩	衲	衽	衿	袂	袢	裆	袷	袼	裉	裢	裎	裣
1	1	1	0	0	1	0	82	蚋	蚬	蚝	蚧	蚣	蚪	蚓	蚩	蚶	蛄	蚵	蛎	蚰	蚺	蚱	蚯	蛉	蛏	蚴	蛩	蛱	蛲	蛭	蛳
1	1	1	0	0	1	1	83	蟾	蠊	蠛	蠡	蠹	蠼	缶	罂	罄	罅	舐	竺	竽	笈	笃	笄	笕	笊	笫	笏	筇	笸	笪	笙
1	1	1	0	1	0	0	84	舾	艄	艉	艋	艏	艚	艟	艨	衾	袅	袈	裘	裟	襞	羝	羟	羧	羯	羰	羲	籼	敉	粑	粝
1	1	1	0	1	0	1	85	醺	豕	鹾	趸	跫	踅	蹙	蹩	趵	趿	趼	趺	跄	跖	跗	跚	跞	跎	跏	跛	跆	跬	跷	跸
1	1	1	0	1	1	0	86	龈	龉	龊	龌	黾	鼋	鼍	隹	隼	隽	雎	雒	瞿	雠	銎	銮	鋈	錾	鍪	鏊	鎏	鐾	鑫	鱿
1	1	1	0	1	1	1	87	鞲	鞴	骱	骰	骷	鹘	骶	骺	骼	髁	髀	髅	髂	髋	髌	髑	魅	魃	魇	魉	魈	魍	魑	飨
1	1	1	1	0	0	0	88																								
1	1	1	1	0	0	1	89																								
1	1	1	1	0	1	0	90																								
1	1	1	1	0	1	1	91																								
1	1	1	1	1	0	0	92																								
1	1	1	1	1	0	1	93																								
1	1	1	1	1	1	0	94																								

Figure 55(j)

SECOND BYTE 第二字节																															
							b7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
							b6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
							b5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
							b4	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
							b3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
							b2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
FIRST BYTE							b1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
第一字节							位	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
b7	b6	b5	b4	b3	b2	b1	区																								
1	1	0	0	0	0	0	64	嘈	嘌	嘁	嘤	嘣	嗾	嘀	嘧	嘭	噘	嘹	噗	嘬	噍	噢	噙	噜	噌	噔	嚆	噤	噱	噫	噻
1	1	0	0	0	0	1	65	嵝	嵫	嵋	嵊	嵩	嵴	嶂	嶙	嶝	豳	嶷	巅	彳	彷	徂	徇	徉	後	徕	徙	徜	徨	徭	徵
1	1	0	0	0	1	0	66	庑	庋	庖	庥	庠	庹	庵	庾	庳	赓	廒	廑	廛	廨	廪	膺	忄	忉	忖	忏	怃	忮	怄	忡
1	1	0	0	0	1	1	67	阈	阊	阋	阌	阍	阏	阒	阕	阖	阗	阙	阚	丬	爿	戕	氵	汔	汜	汊	沣	沅	沐	沔	沌
1	1	0	0	1	0	0	68	湫	溲	湟	溆	湓	湔	渲	渥	湄	滟	溱	溘	滠	漭	滢	溥	溧	溽	溻	溷	滗	溴	滏	溏
1	1	0	0	1	0	1	69	逍	逖	逡	逵	逶	逭	逯	遄	遑	遒	遐	遨	遘	遢	遛	暹	遴	遽	邂	邈	邃	邋	彐	彗
1	1	0	0	1	1	0	70	嫘	嫜	嬉	嬗	嬖	嬲	嬷	孀	尕	尜	孚	孥	孳	孑	孓	孢	驵	驷	驸	驺	驿	驽	骀	骁
1	1	0	0	1	1	1	71	缧	缪	缫	缬	缭	缯	缰	缱	缲	缳	缵	幺	畿	巛	甾	邕	玎	玑	玮	玢	玟	珏	珂	珑
1	1	0	1	0	0	0	72	栊	柩	枰	栌	柙	枵	柚	枳	柝	栀	柃	枸	柢	栎	柁	柽	栲	栳	桠	桡	桎	桢	桄	桤
1	1	0	1	0	0	1	73	樾	檠	橐	橛	樵	檎	橹	樽	樨	橘	橼	檑	檐	檩	檗	檫	猷	獒	殁	殂	殇	殄	殒	殓
1	1	0	1	0	1	0	74	晷	暄	暌	暧	暝	暾	曛	曜	曦	曩	贲	贳	贶	贻	贽	赀	赅	赆	赈	赉	赇	赍	赕	赙
1	1	0	1	0	1	1	75	胄	胙	胍	胗	朐	胝	胫	胱	胴	胭	脍	脎	胲	胼	朕	脒	豚	脶	脞	脬	脘	脲	腈	腌
1	1	0	1	1	0	0	76	煨	煅	煲	煊	煸	煺	熘	熳	熵	熨	熠	燠	燔	燧	燹	爝	爨	灬	焘	煦	熹	戾	戽	扃
1	1	0	1	1	0	1	77	硇	硌	硪	碛	碓	碚	碇	碜	碡	碣	碲	碹	碥	磔	磙	磉	磬	磲	礅	磴	礓	礤	礞	礴
1	1	0	1	1	1	0	78	钚	钛	钜	钣	钤	钫	钪	钭	钬	钯	钰	钲	钴	钶	钷	钸	钹	钺	钼	钽	钿	铄	铈	铉
1	1	0	1	1	1	1	79	镄	镅	镆	镉	镌	镎	镏	镒	镓	镔	镖	镗	镘	镙	镛	镞	镟	镝	镡	镢	镤	镥	镦	镧
1	1	1	0	0	0	0	80	鹦	鹧	鹨	鹩	鹪	鹫	鹬	鹱	鹭	鹳	疒	疔	疖	疠	疝	疬	疣	疳	疴	疸	痄	疱	疰	痃
1	1	1	0	0	0	1	81	裥	裱	褚	裼	裨	裾	裰	褡	褙	褓	褛	褊	褴	褫	褶	襁	襦	襻	疋	胥	皲	皴	矜	耒
1	1	1	0	0	1	0	82	蛐	蜓	蛞	蛴	蛟	蛘	蛑	蜃	蜇	蛸	蜈	蜊	蜍	蜉	蜣	蜻	蜞	蜥	蜮	蜚	蜾	蝈	蜴	蜱
1	1	1	0	0	1	1	83	笮	笱	笠	笥	笤	笳	笾	笞	筘	筚	筅	筵	筌	筝	筠	筮	筻	筢	筲	筱	箐	箦	箧	箸
1	1	1	0	1	0	0	84	粜	粞	粢	粲	粼	粽	糁	糇	糌	糍	糈	糅	糗	糨	艮	暨	羿	翎	翕	翥	翡	翦	翩	翮
1	1	1	0	1	0	1	85	跣	跹	跻	跤	踉	跽	踔	踝	踟	踬	踮	踣	踯	踺	蹀	踹	踵	踽	踱	蹉	蹁	蹂	蹑	蹒
1	1	1	0	1	1	0	86	鲂	鲅	鲆	鲇	鲈	稣	鲋	鲎	鲐	鲑	鲒	鲔	鲕	鲚	鲛	鲞	鲟	鲠	鲡	鲢	鲣	鲥	鲦	鲧
1	1	1	0	1	1	1	87	餍	餮	饕	饔	髟	髡	髦	髯	髫	髻	髭	髹	鬈	鬏	鬓	鬟	鬣	麽	麾	縻	麂	麇	麈	麋
1	1	1	1	0	0	0	88																								
1	1	1	1	0	0	1	89																								
1	1	1	1	0	1	0	90																								
1	1	1	1	0	1	1	91																								
1	1	1	1	1	0	0	92																								
1	1	1	1	1	0	1	93																								
1	1	1	1	1	1	0	94																								

Figure 55(k)

SECOND BYTE 第二字节																								
b_7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b_6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b_5	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
b_4	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
b_3	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
b_2	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
b_1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
位	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	

FIRST BYTE 第一字节							
b_7	b_6	b_5	b_4	b_3	b_2	b_1	区
1	1	0	0	0	0	0	64
1	1	0	0	0	0	1	65
1	1	0	0	0	1	0	66
1	1	0	0	0	1	1	67
1	1	0	0	1	0	0	68
1	1	0	0	1	0	1	69
1	1	0	0	1	1	0	70
1	1	0	0	1	1	1	71
1	1	0	1	0	0	0	72
1	1	0	1	0	0	1	73
1	1	0	1	0	1	0	74
1	1	0	1	0	1	1	75
1	1	0	1	1	0	0	76
1	1	0	1	1	0	1	77
1	1	0	1	1	1	0	78
1	1	0	1	1	1	1	79
1	1	1	0	0	0	0	80
1	1	1	0	0	0	1	81
1	1	1	0	0	1	0	82
1	1	1	0	0	1	1	83
1	1	1	0	1	0	0	84
1	1	1	0	1	0	1	85
1	1	1	0	1	1	0	86
1	1	1	0	1	1	1	87
1	1	1	1	0	0	0	88
1	1	1	1	0	0	1	89
1	1	1	1	0	1	0	90
1	1	1	1	0	1	1	91
1	1	1	1	1	0	0	92
1	1	1	1	1	0	1	93
1	1	1	1	1	1	0	94

Figure 55(1)

Second Byte	0	32 127
First Byte 0	C1 (figure 5)	LATIN ALPHABET OR BLOCK MOSAICS
1		JAPANESE HIRAGANA
2		JAPANESE KATAKANA
3		HAN'GUL ALPHABETIC LETTERS
4		LINE DRAWING CHARACTERS
21		DOWNLOADED IDEOGRAPHIC CHARACTERS
22		DOWNLOADED IDEOGRAPHIC CHARACTERS
23 TO 127		HAN'GUL SYLLABLES

Figure 56 HAN'GUL 2-BYTE CODE TABLE

The characters in rows 0 to 4 defined by the second byte are identical to the following single byte character sets:

Row 0 Figure 3 and 3(a) US Option or figure 5
Row 1 Figure 58
Row 2 Figure 59
Row 3 Figure 57 Han'gul characters from columns 4 to 7 only but less 4/0 and 7/15
Row 4 Figure 60

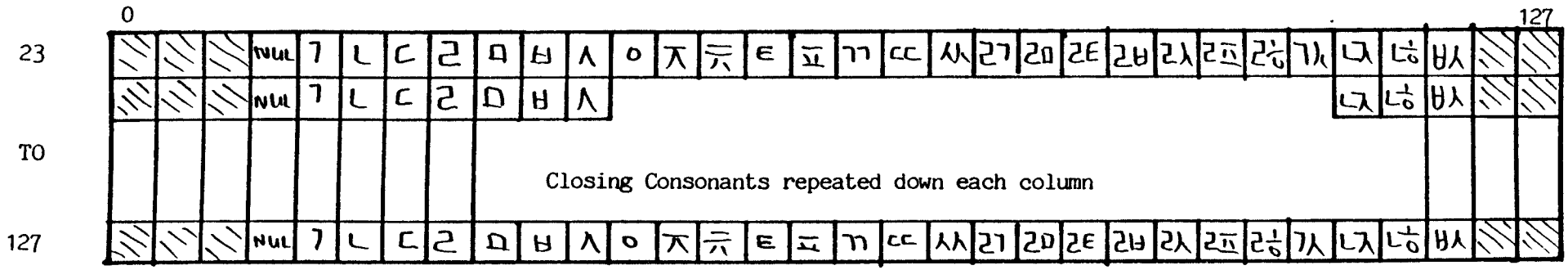


Figure 56(a) HAN'GUL 2-BYTE CODE TABLE - CLOSING CONSONANTS

Each column is a block of 4 entries of open syllables.

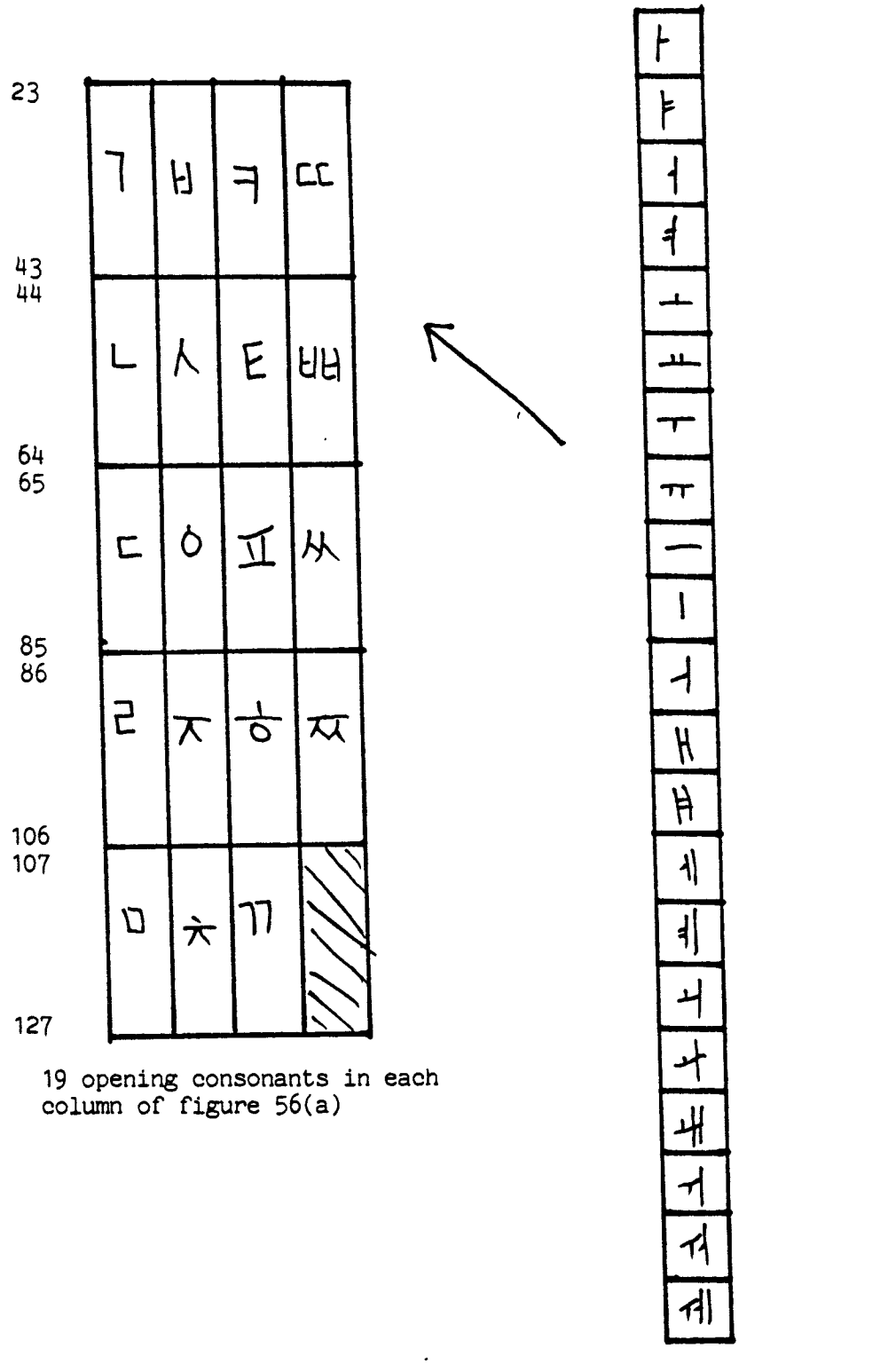
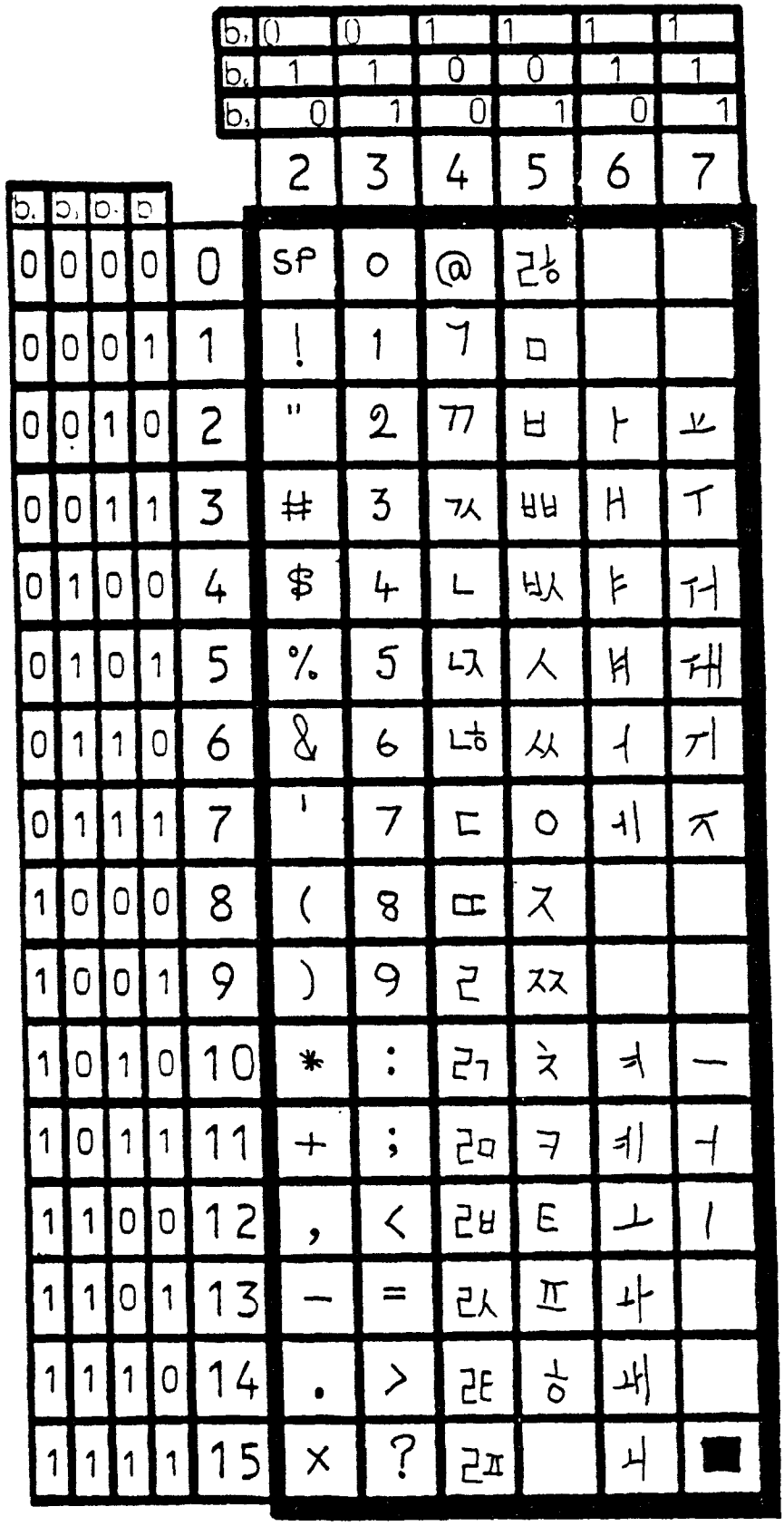


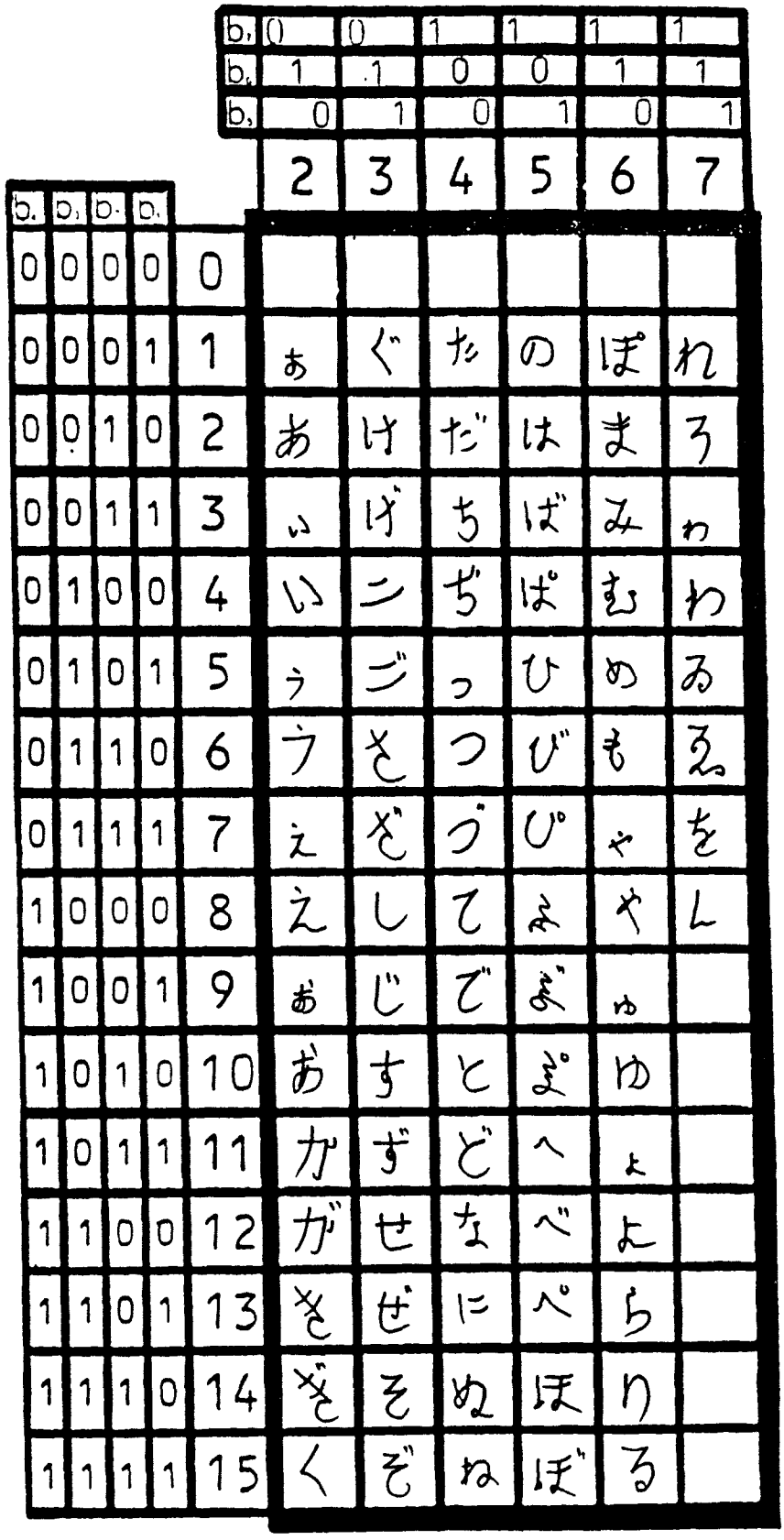
Figure 56(b) HAN'GUL 2-BYTE CODE TABLE
OPEN SYLLABLES



b7	b6	b5	b4		2	3	4	5	6	7
					b3 0	0	1	1	1	1
					b2 1	1	0	0	1	1
					b1 0	1	0	1	0	1
0	0	0	0	0	SP	0	@	강		
0	0	0	1	1	!	1	ㄱ	ㅁ		
0	0	1	0	2	"	2	ㄲ	ㅂ	ㅏ	ㅛ
0	0	1	1	3	#	3	ㄳ	ㅃ	ㅐ	ㅜ
0	1	0	0	4	$	4	ㄴ	ㅄ	ㅑ	ㅝ
0	1	0	1	5	%	5	ㄵ	ㅅ	ㅒ	ㅞ
0	1	1	0	6	&	6	ㄶ	ㅆ	ㅓ	ㅟ
0	1	1	1	7	'	7	ㄷ	ㅇ	ㅔ	ㅠ
1	0	0	0	8	(	8	ㄸ	ㅈ		
1	0	0	1	9	)	9	ㄹ	ㅉ		
1	0	1	0	10	*	:	ㄺ	ㅊ	ㅖ	ㅡ
1	0	1	1	11	+	;	ㄻ	ㅋ	ㅖ	ㅢ
1	1	0	0	12	,	<	ㄼ	ㅌ	ㅗ	ㅣ
1	1	0	1	13	-	=	ㄽ	ㅍ	ㅘ	
1	1	1	0	14	.	>	ㄾ	ㅎ	ㅙ	
1	1	1	1	15	×	?	ㄿ		ㅚ	■

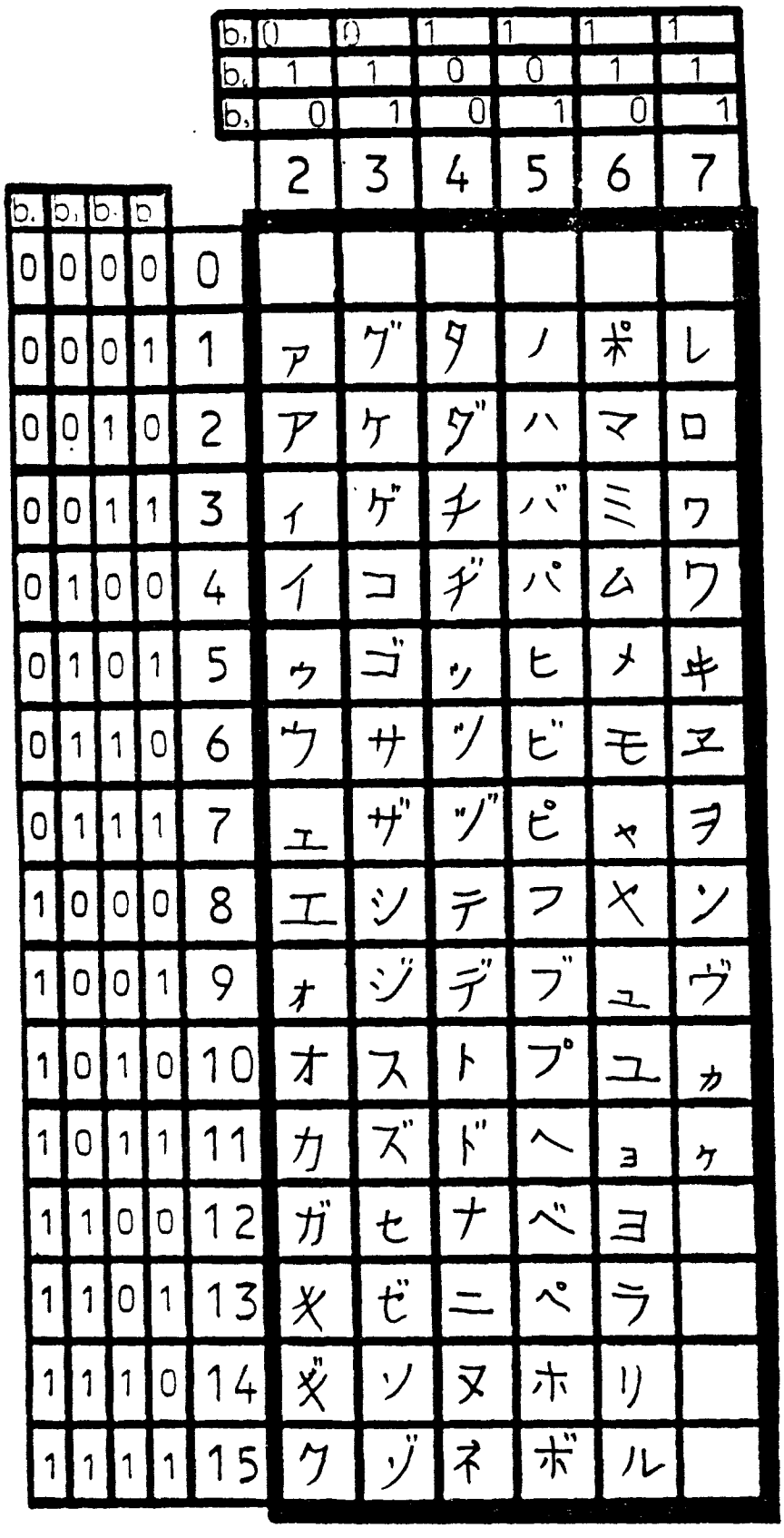
Figure 57 HAN'GUL SINGLE BYTE NON-SYLLABIC CHARACTER SET

The character in position 7/15 occupies an area equivalent to that of any character that does not include a descender It is thus a rectangle surrounded by the background colour



b_4	b_3	b_2	b_1		2	3	4	5	6	7
					0	0	1	1	1	1
					1	1	0	0	1	1
					0	1	0	1	0	1
0	0	0	0	0						
0	0	0	1	1	ぁ	ぐ	た	の	ぽ	れ
0	0	1	0	2	あ	け	だ	は	ま	ろ
0	0	1	1	3	ぃ	げ	ち	ば	み	ゎ
0	1	0	0	4	い	こ	ぢ	ぱ	む	わ
0	1	0	1	5	ぅ	ご	っ	ひ	め	ゐ
0	1	1	0	6	う	さ	つ	び	も	ゑ
0	1	1	1	7	ぇ	ざ	づ	ぴ	ゃ	を
1	0	0	0	8	え	し	て	ふ	や	ん
1	0	0	1	9	ぉ	じ	で	ぶ	ゅ	
1	0	1	0	10	お	す	と	ぷ	ゆ	
1	0	1	1	11	か	ず	ど	へ	ょ	
1	1	0	0	12	が	せ	な	べ	よ	
1	1	0	1	13	き	ぜ	に	ぺ	ら	
1	1	1	0	14	ぎ	そ	ぬ	ほ	り	
1	1	1	1	15	く	ぞ	ね	ぼ	る	

Figure 58 Japanese Hiragana Character Set



b_7	0	0	1	1	1	1
b_6	1	1	0	0	1	1
b_5	0	1	0	1	0	1
	2	3	4	5	6	7
b_4 b_3 b_2 b_1						
0 0 0 0 0						
0 0 0 1 1	ァ	グ	タ	ノ	ポ	レ
0 0 1 0 2	ア	ケ	ダ	ハ	マ	ロ
0 0 1 1 3	ィ	ゲ	チ	バ	ミ	ワ
0 1 0 0 4	イ	コ	ヂ	パ	ム	ワ
0 1 0 1 5	ゥ	ゴ	ッ	ヒ	メ	ヰ
0 1 1 0 6	ウ	サ	ツ	ビ	モ	ヱ
0 1 1 1 7	ェ	ザ	ヅ	ピ	ャ	ヲ
1 0 0 0 8	エ	シ	テ	フ	ヤ	ン
1 0 0 1 9	ォ	ジ	デ	ブ	ュ	ヴ
1 0 1 0 10	オ	ス	ト	プ	ユ	ヵ
1 0 1 1 11	カ	ズ	ド	ヘ	ョ	ヶ
1 1 0 0 12	ガ	セ	ナ	ベ	ヨ	
1 1 0 1 13	キ	ゼ	ニ	ペ	ラ	
1 1 1 0 14	ギ	ソ	ヌ	ホ	リ	
1 1 1 1 15	ク	ゾ	ネ	ボ	ル	

Figure 59 Japanese Katakana Character Set

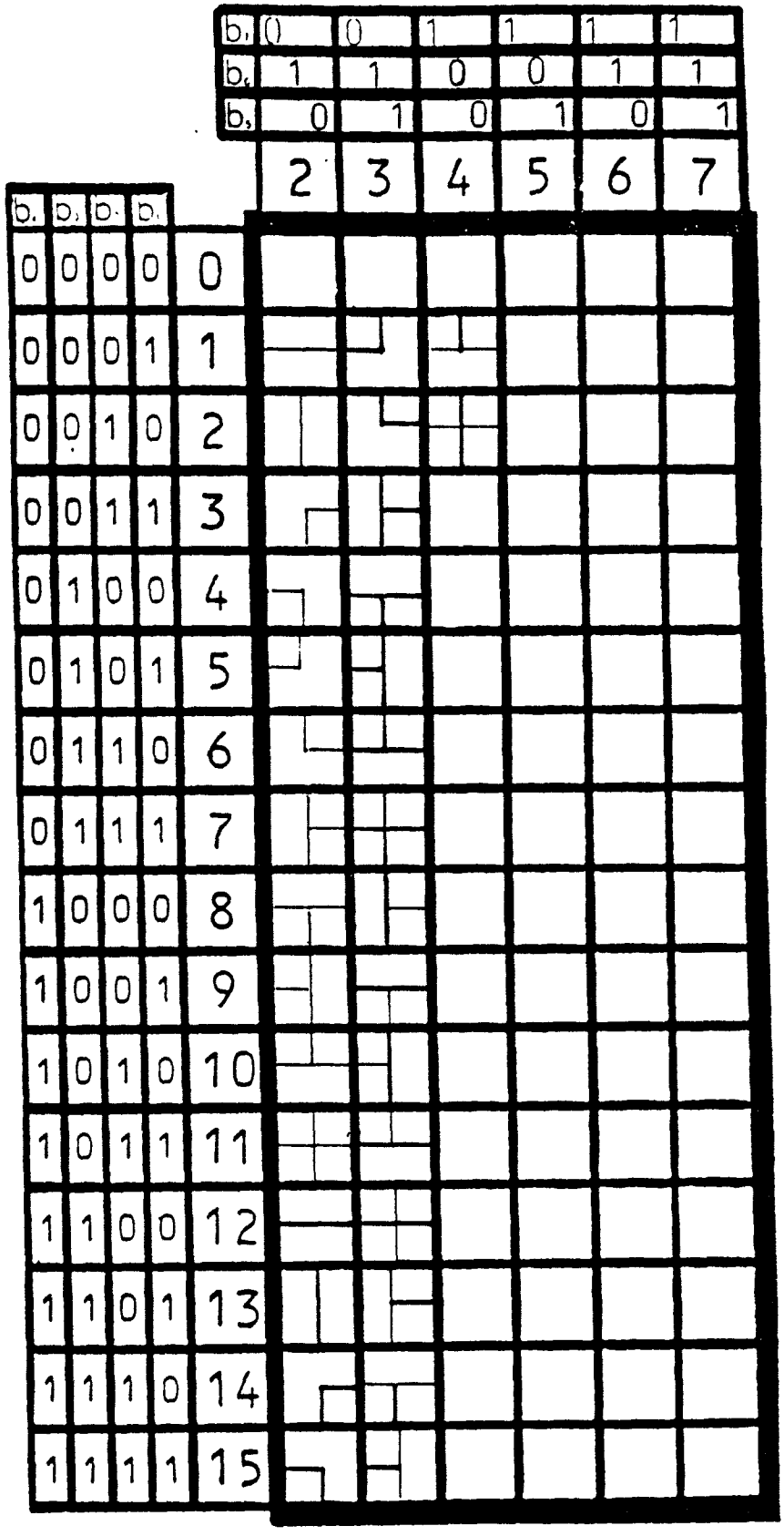
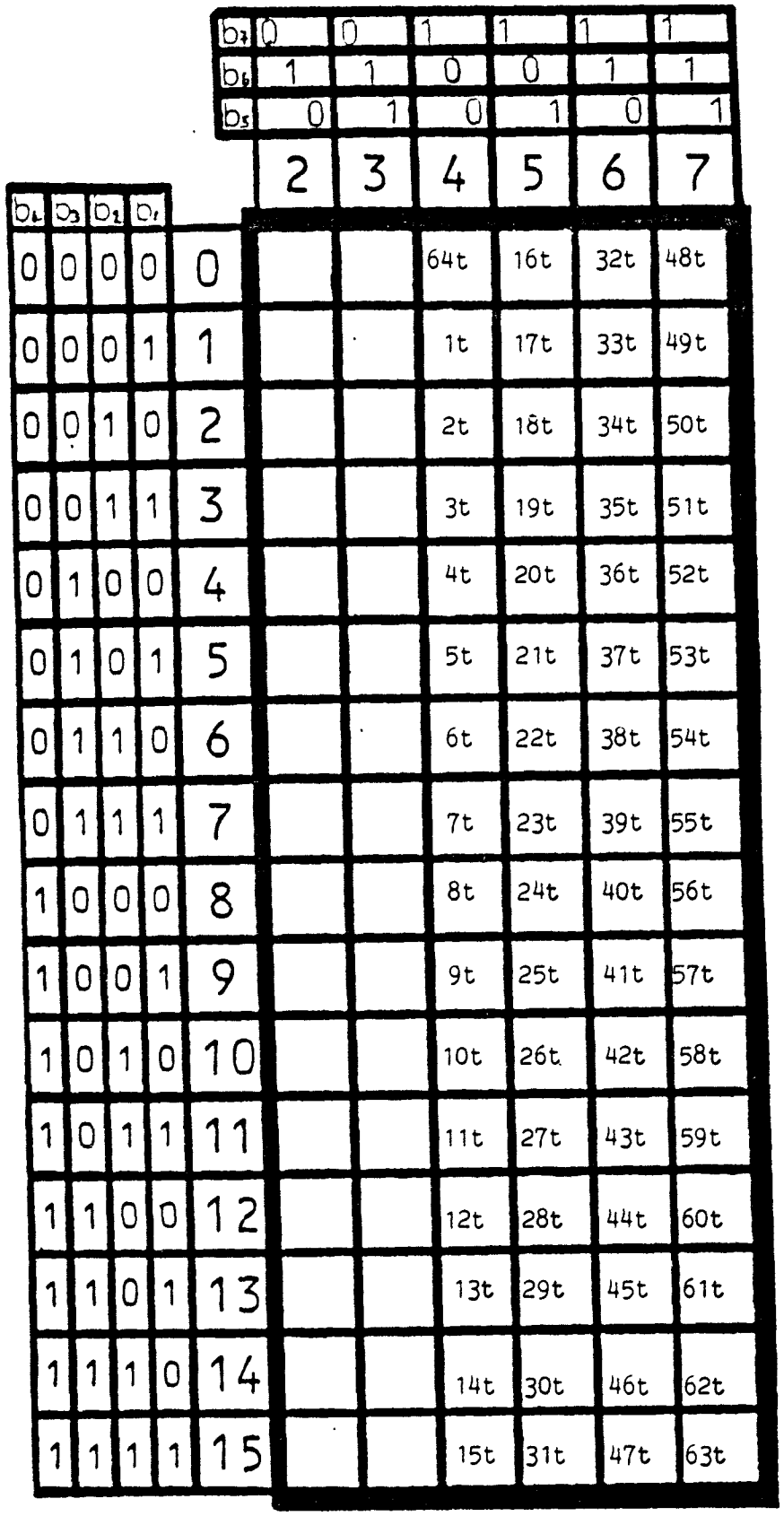


Figure 60 Line Drawing Character Set

b_4	b_3	b_2	b_1		b_7 0	0	1	1	1	1
					b_6 1	1	0	0	1	1
					b_5 0	1	0	1	0	1
					2	3	4	5	6	7
0	0	0	0	0	RST	C2	E3	G4#	C6	E7
0	0	0	1	1	A0#	C2	F3#	A4#	C6	F7#
0	0	1	0	2	A0	D2	F3	A4	D6	F7
0	0	1	1	3	B0	D2#	G3	B4	D6#	G7
0	1	0	0	4	C1	E2	G3#	C5	E6	G7#
0	1	0	1	5	C1#	F2	A3	C5#	F6	A7
0	1	1	0	6	D1	F2#	A3#	D5	F6	A7#
0	1	1	1	7	D1#	G2	B3	D5#	G6	B7
1	0	0	0	8	E1	G2#	C4	E5	G6#	C8
1	0	0	1	9	F1	A2	C4#	F5	A6	
1	0	1	0	10	F1#	A2#	D4	F5#	A6#	
1	0	1	1	11	G1	B2	D4#	G5	B6	
1	1	0	0	12	G1#	C3	E4	G5#	C7	
1	1	0	1	13	A1	C3#	F4	A5	C7#	
1	1	1	0	14	A1#	D3	F4#	A5#	D7	
1	1	1	1	15	B1	D3#	G4	B5	D7#	IP

Figure 61 TONE PITCH CODE TABLE T1 SET
A4=440Hz. Relative pitches produce a tempered scale, adjacent tones are related in frequency by a ratio of 2^{12} to 1.
RST=REST IP=INDEFINITE PITCH
Unallocated codes are reserved.



b_4	b_3	b_2	b_1		b_7 0	0	1	1	1	1
					b_6 1	1	0	0	1	1
					b_5 0	1	0	1	0	1
					2	3	4	5	6	7
0	0	0	0	0			64t	16t	32t	48t
0	0	0	1	1			1t	17t	33t	49t
0	0	1	0	2			2t	18t	34t	50t
0	0	1	1	3			3t	19t	35t	51t
0	1	0	0	4			4t	20t	36t	52t
0	1	0	1	5			5t	21t	37t	53t
0	1	1	0	6			6t	22t	38t	54t
0	1	1	1	7			7t	23t	39t	55t
1	0	0	0	8			8t	24t	40t	56t
1	0	0	1	9			9t	25t	41t	57t
1	0	1	0	10			10t	26t	42t	58t
1	0	1	1	11			11t	27t	43t	59t
1	1	0	0	12			12t	28t	44t	60t
1	1	0	1	13			13t	29t	45t	61t
1	1	1	0	14			14t	30t	46t	62t
1	1	1	1	15			15t	31t	47t	63t

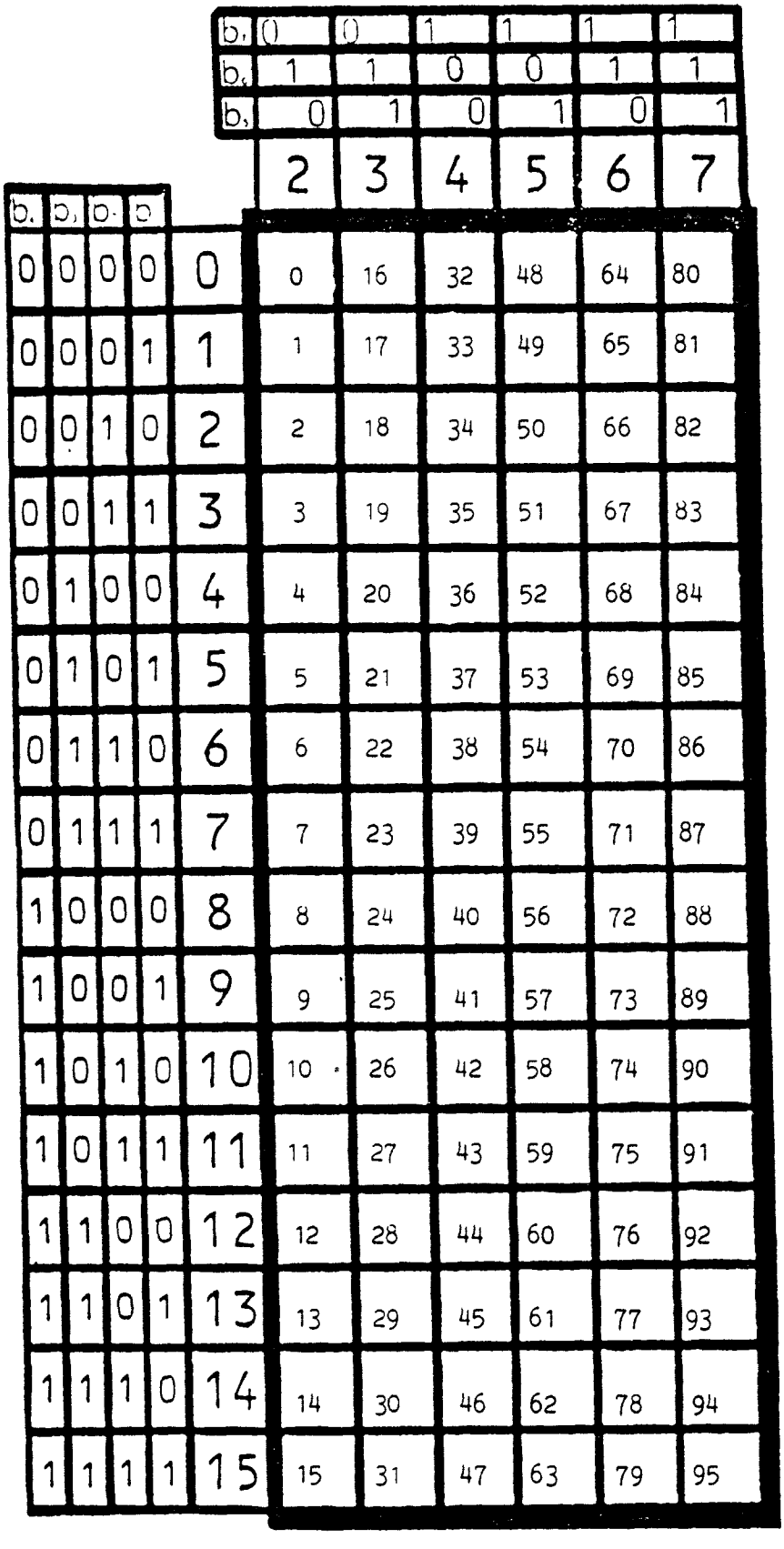
Figure 62 TONE DURATION CODE TABLE T2 SET

t=n0.01s where n is the parameter associated with the control character START MUSIC CODES (SMC). Unallocated codes are reserved.

	0	1
0	Start of Music Codes (SMC)	Sound Level (SLV)
1	Start of Melodic Part (SMP)	
2	Start of Rhythmic Part (SRP)	
3		
4	End of Musical Codes (EMC)	
5	End of Part (EOP)	
6		
7		
8	Label (LBL)	Duration Multiplier (LRT)
9	Jump (JMP)	
10	Repeat Number of Times (RNT)	Repeat Start Label (RSL)
11	Branch After Passing (BAP)	Branch to Label (BTL)
12	Change of Timbre (CTM)	
13		
14		
15		

Figure 63 MUSICAL CONTROL CHARACTERS - Cm SET

These control codes, with the exception of 0/4 and 0/5 are followed immediately by a byte defining an associated parameter.
Codes 0/4 and 0/5 are transmitted twice.
Unallocated codes are reserved.



b_4	b_3	b_2	b_1		b_7 0	b_7 0	b_7 1	b_7 1	b_7 1	b_7 1
					b_6 1	b_6 1	b_6 0	b_6 0	b_6 1	b_6 1
					b_5 0	b_5 1	b_5 0	b_5 1	b_5 0	b_5 1
					2	3	4	5	6	7
0	0	0	0	0	0	16	32	48	64	80
0	0	0	1	1	1	17	33	49	65	81
0	0	1	0	2	2	18	34	50	66	82
0	0	1	1	3	3	19	35	51	67	83
0	1	0	0	4	4	20	36	52	68	84
0	1	0	1	5	5	21	37	53	69	85
0	1	1	0	6	6	22	38	54	70	86
0	1	1	1	7	7	23	39	55	71	87
1	0	0	0	8	8	24	40	56	72	88
1	0	0	1	9	9	25	41	57	73	89
1	0	1	0	10	10	26	42	58	74	90
1	0	1	1	11	11	27	43	59	75	91
1	1	0	0	12	12	28	44	60	76	92
1	1	0	1	13	13	29	45	61	77	93
1	1	1	0	14	14	30	46	62	78	94
1	1	1	1	15	15	31	47	63	79	95

Figure 64 DECIMAL DIGIT CODE TABLE FOR USE WITH MUSICAL CONTROLS Cm SET.

TIMBRE SIMULATING INSTRUMENT	CODE
Violin	1/0
Plucked String	1/1
Piano	1/2
Flute	2/0
Clarinet	2/1
Oboe	2/1
Trumpet	2/3
Organ (diapason)	3/0
Vibraphone	4/0

Figure 65 MELODIC INSTRUMENTAL TIMBRE

Codes are defined by the parameter associated with the respective control character.
Codes used in figures 65 and 66 are mutually exclusive.
Unallocated codes are reserved.

TIMBRE SIMULATING INTRUMENT	CODE
Snare Drum	5/0
Bass Drum	5/1
Tom-tom	6/0
Single Cymbal	7/0
Pair of Cymbals	7/1

Figure 66 RHYTHMIC PERCUSSION INSTRUMENTAL TIMBRE

Codes are defined by the parameter associated with the respective control character.
Codes used in figures 65 and 66 are mutually exclusive.
Unallocated codes are reserved.

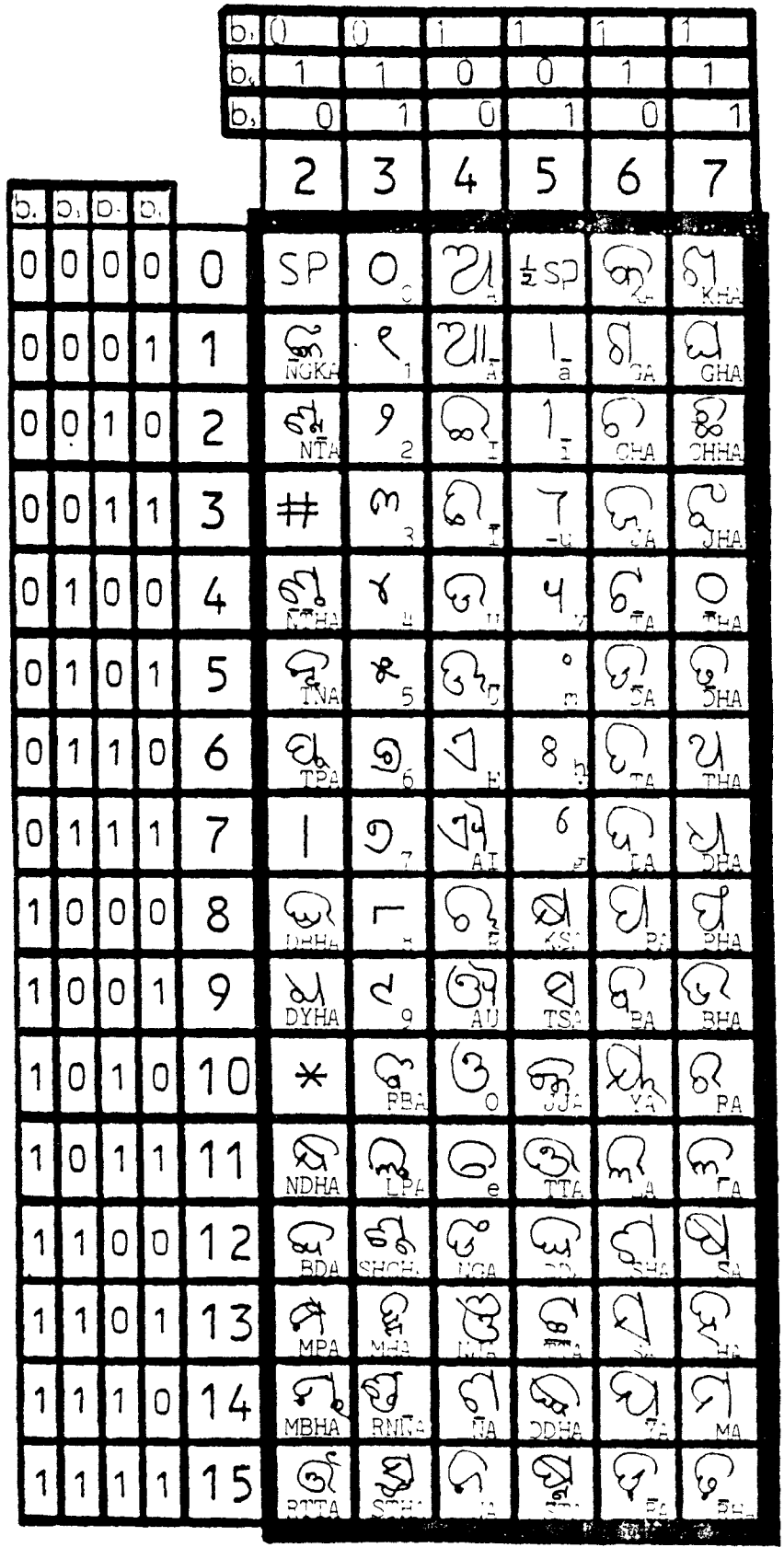


Figure 67 ORIYA PRIMARY GO SET
Characters in positions 5/0 to 5/7 occupy half the width of other characters

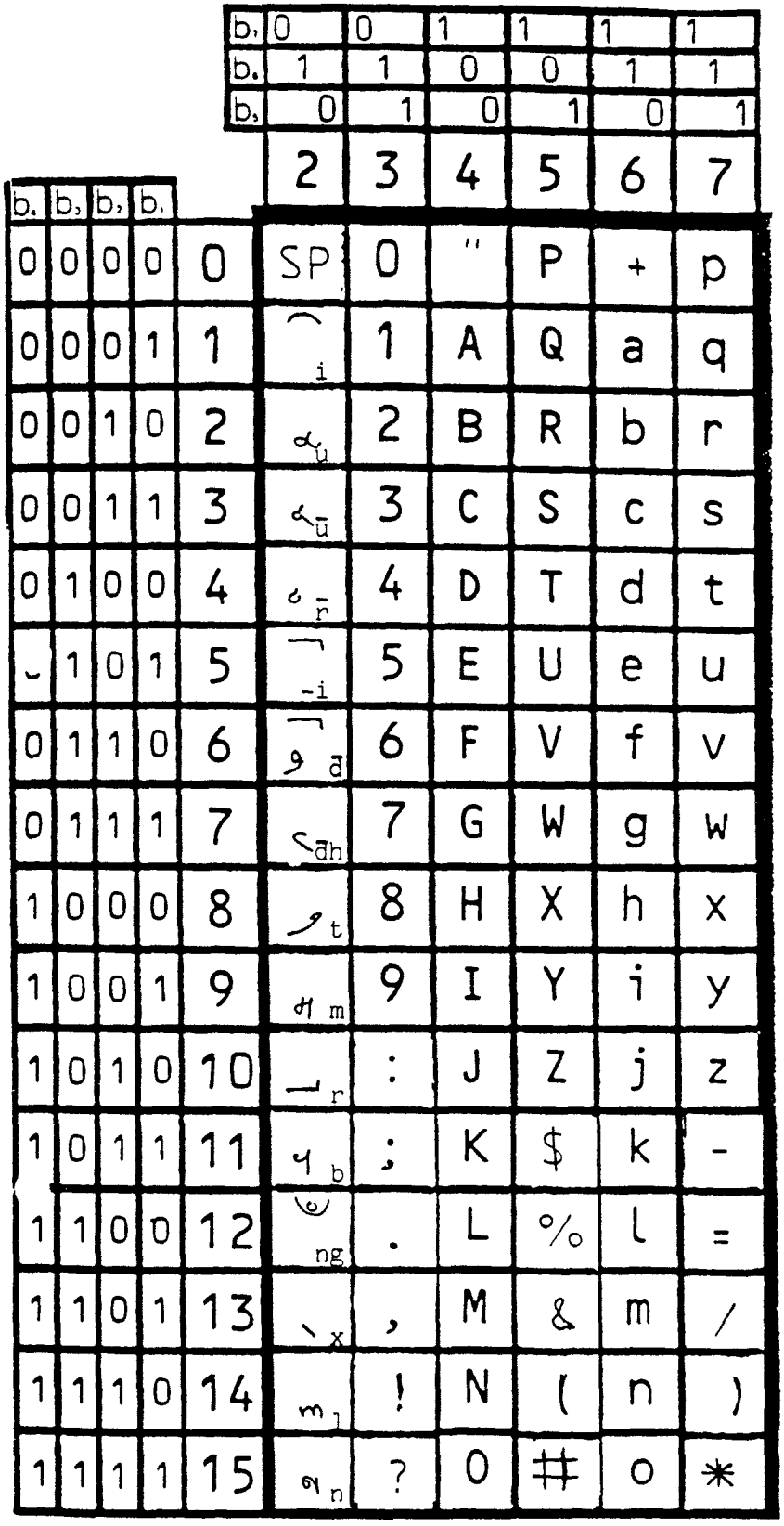


Figure 68 ORIYA SUPPLEMENTARY G2 SET

Characters in positions 2/1 to 2/15 are diacritical marks for use with G0 set characters
The character in position 2/13 is used to cancel an implicit vowel.
The character SP (2/0) in addition to the function of SPACE can act as a NUL diacritical mark.

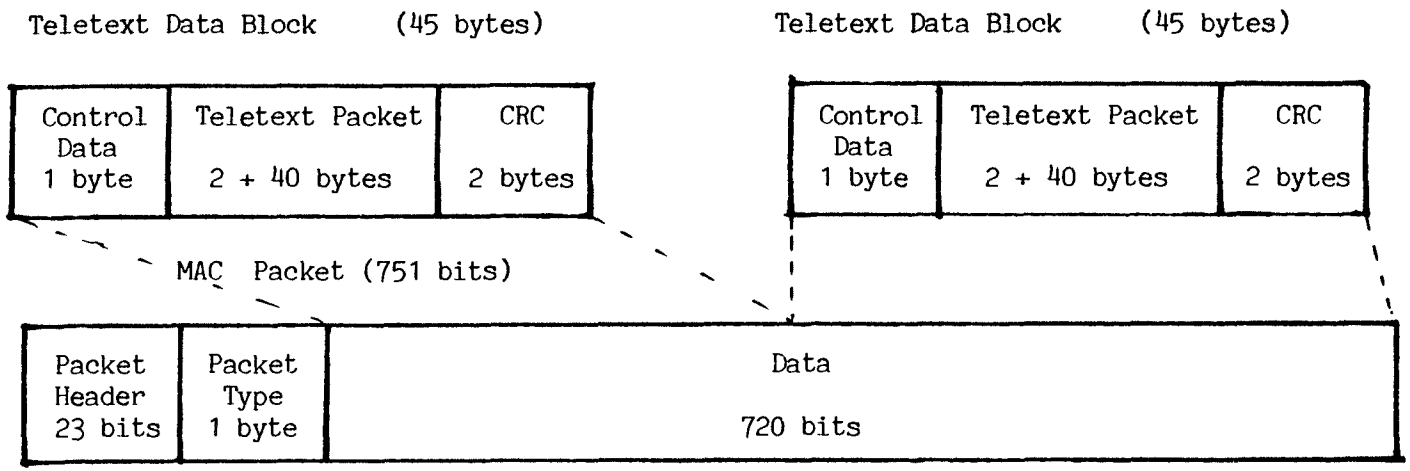


Figure 69 Teletext Packets in the MAC/packet Multiplex First Level Protection

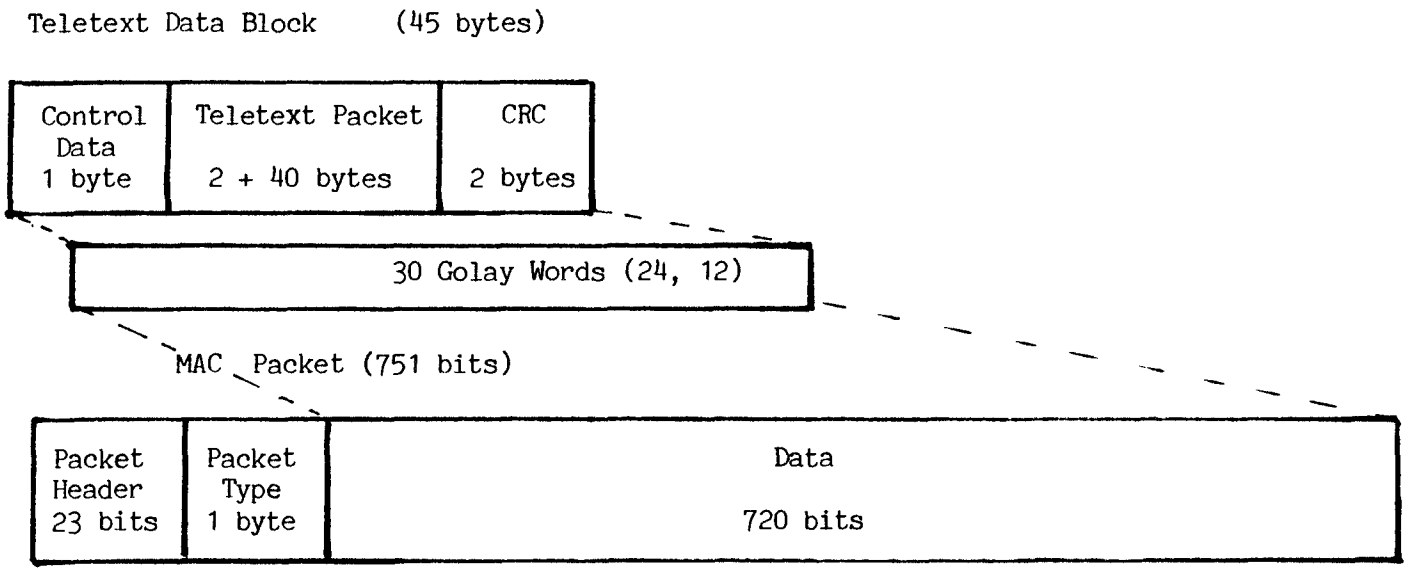


Figure 70 Teletext Packets in the MAC/packet Multiplex Second Level Protection

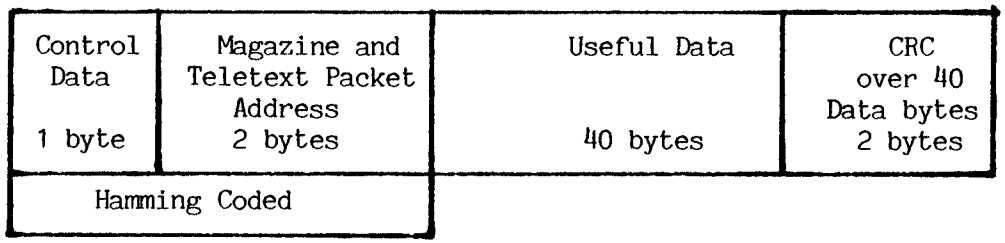


Figure 71 Format of Teletext Data Block Containing Teletext Packet

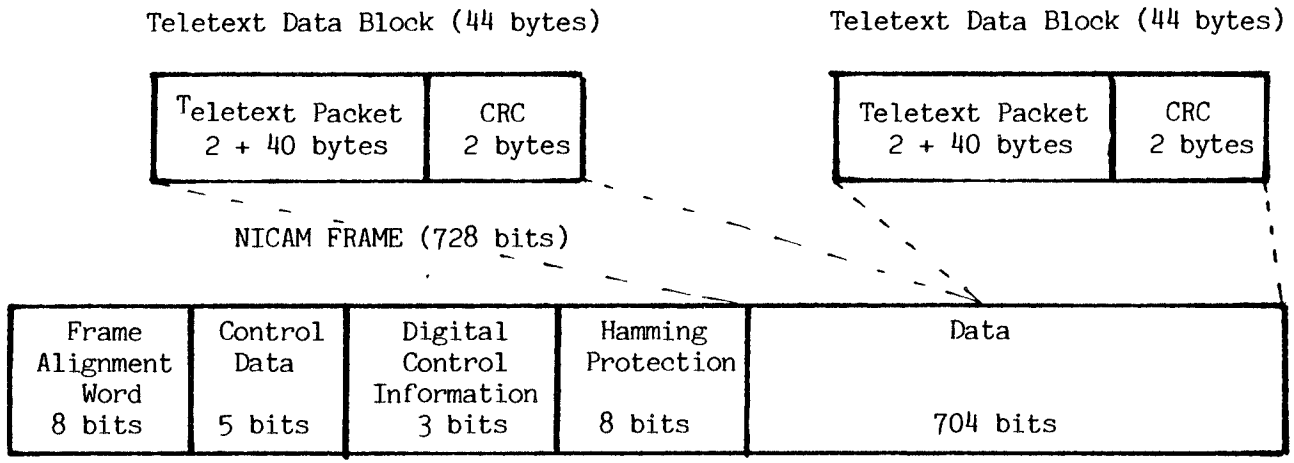


Figure 72 Teletext Packets in the NICAM 728 Data Frame First Level Protection

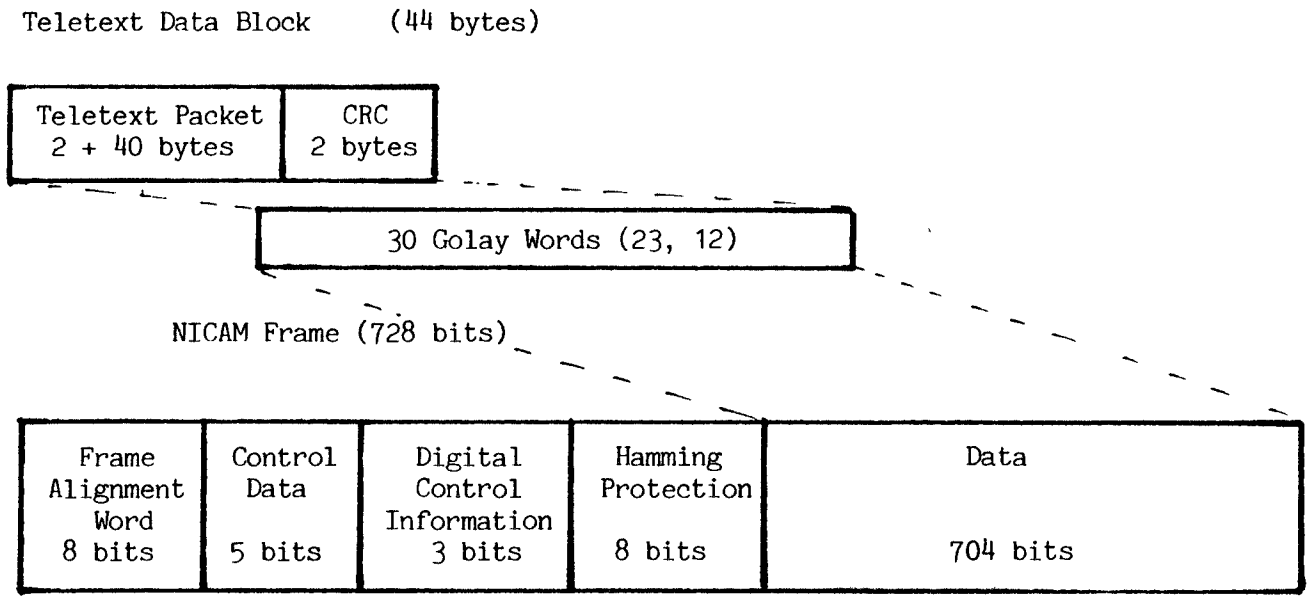


Figure 73 Teletext Packets in the NICAM 728 Data Frame Second Level Protection

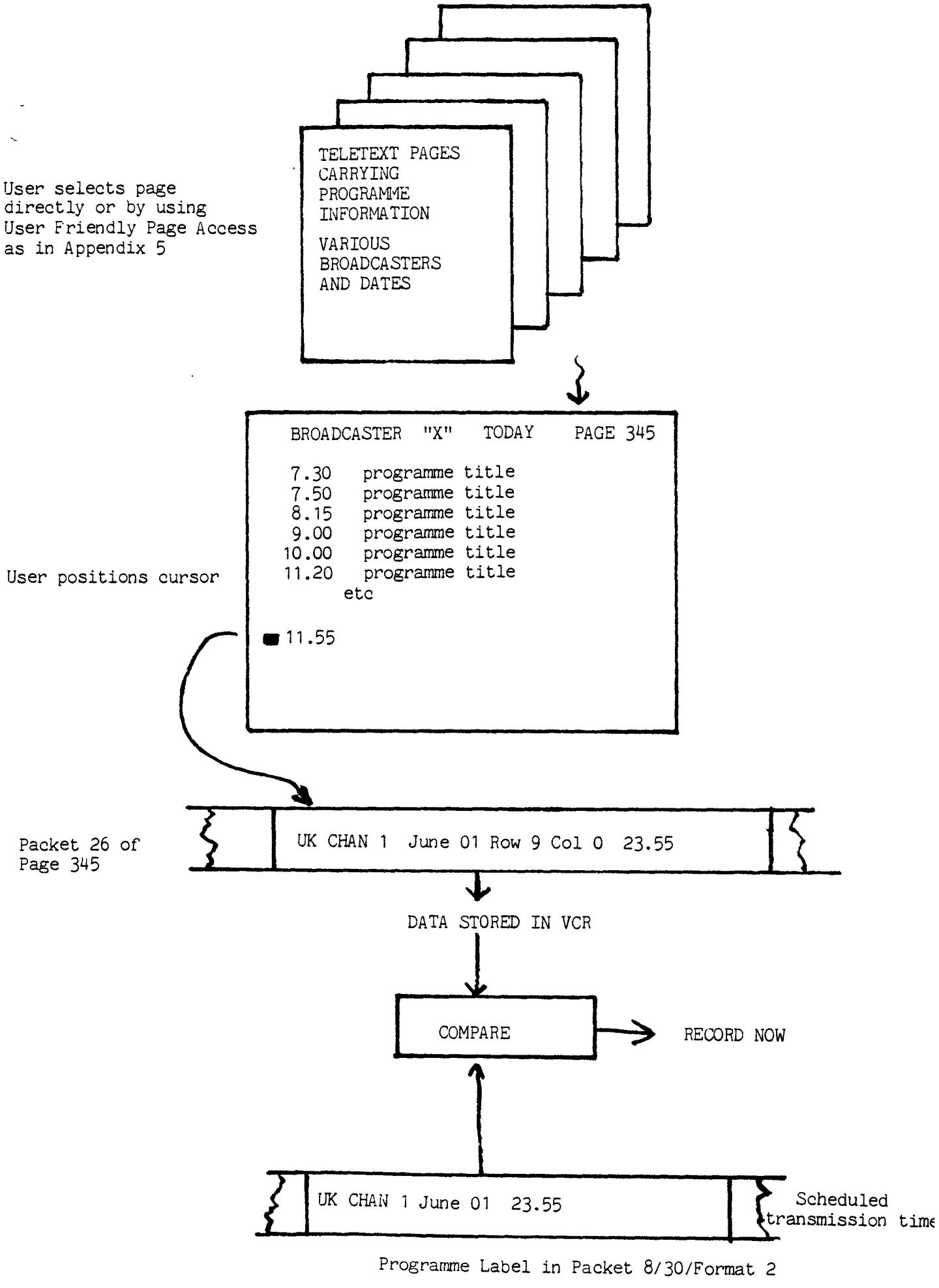


Figure 75 VPT Using Packet 8/30 Format 2 and Teletext Pages

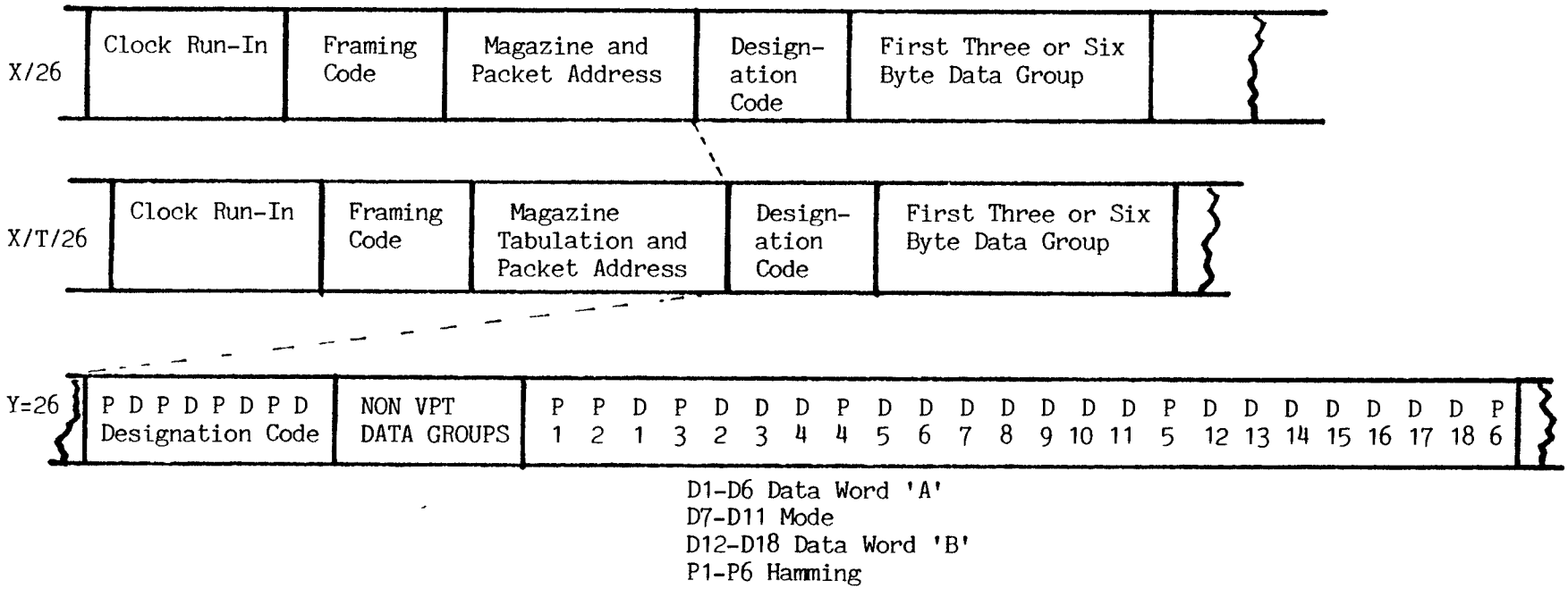
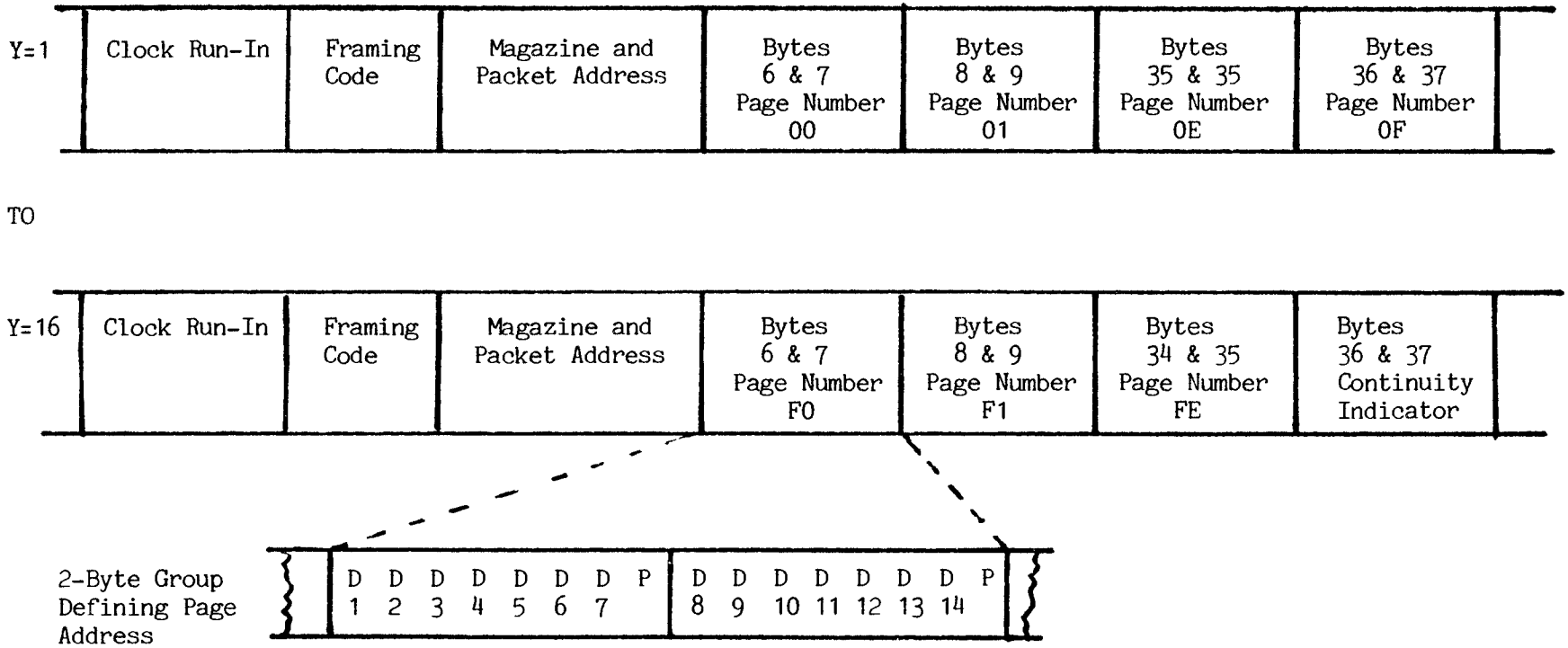


Figure 76 FORMAT OF PACKETS WITH Y=26 CARRYING VPT DATA

NOTE (1) P=Hamming Bit D=Data Bit



D = data bits P = parity bits

D1 to D13 = number of currently transmitted pages of respective page address, least significant bit first.
D14 = Memory Allocation Flag

Except for Continuity Indicator where D1 to D14 represent a binary number incremented at each change in the page content.

For 625 line 50 field applications bytes 38 to 45 are reserved.
For 525 line 60 field applications packets with Tabulation bit T=1 are reserved.
For all applications packets with Y=17 to Y=26 are reserved.

Figure 77 FORMAT OF MAGAZINE INVENTORY PAGE

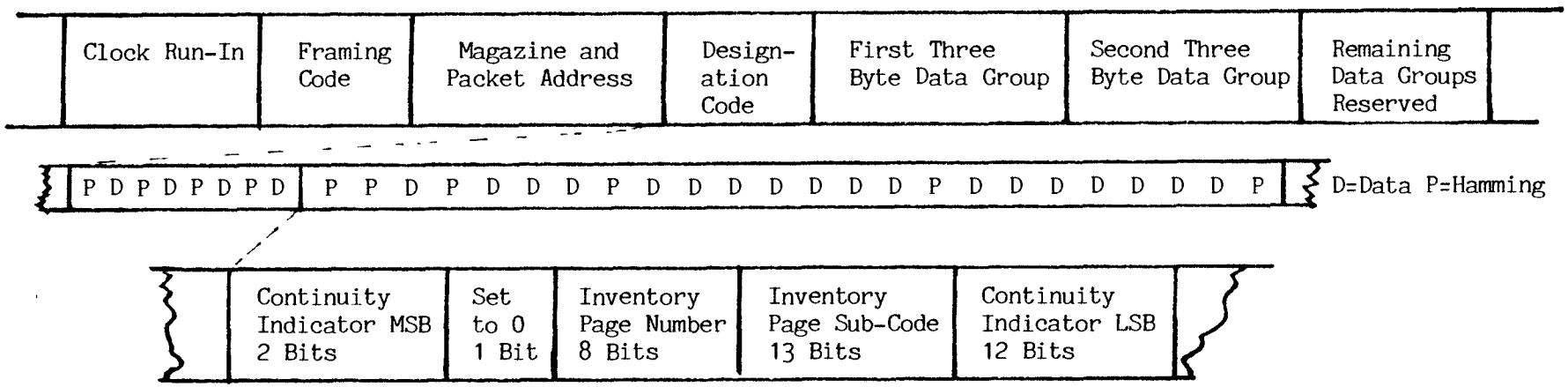


Figure 78(a) FORMAT OF PACKET X/29 OF A MAGAZINE INVENTORY PAGE

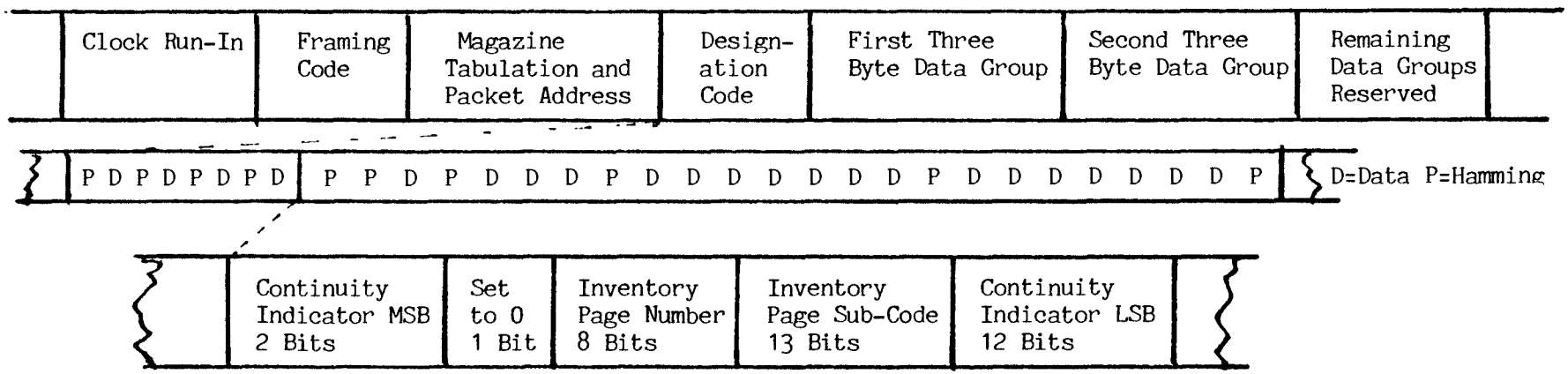


Figure 78(b) FORMAT OF PACKET X/0/29 OF A MAGAZINE INVENTORY PAGE

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
1		DDR	ALG	AND	ISR	I	BEL	BLR	AZR	ALB	AUT	HNG	MLT	D	CNR	EGY
2		GRC	CYP	SM	SUI	JOR	FNL	LUX	BUL	DNK	GIB	IRQ	G	LBY	ROU	F
3		MRC	TCH	POL	CVA		SYR	TUN	MAR	LIE	ISL	MCO			E	NOR
4			IRL	TUR			YUG	UKR	HOL		LBN				S	
F	COUNTRY DEFINED BY 4-BIT COLUMN ADDRESS - ROW ADDRESS IS 'DONT CARE'															

When the column address is set to F the country is defined as in the Radio Data System (RDS) specification, see EBU Technical Document 3244 Appendix 4. It is to be noted that some ambiguity, considered acceptable, results.

The Country Code used in the code table are those defined by the ITU.

Figure 79 Country Codes

CODE	PROGRAMME TYPE	REFERENCE NUMBER
00	Information not included	
01-3E	INTENDED AUDIENCE	
08	General Audience	2.0.0
	Special Groups	
10	Ethnic & Immigrant Groups	1.1.0
11	Ethnic Groups	1.1.1
12	Immigrant Groups	1.1.2
18	Age Groups	1.2.0
19	Children (0-13 years)	1.2.1
1A	Young people (14 years and over)	1.2.2
1F	Retired people	1.3.0
20	Disabled people	1.4.0
21	Blind people	1.4.1
22	Deaf people	1.4.2
28	Householders	1.5.0
30	Occupational Status Groups	1.6.0
31	Unemployed people	1.6.1
32	Students	1.6.2
33	Farmers	1.6.3
34	Fishermen & Sailors	1.6.4
38	Travellers	1.7.0
39	Motorists	1.7.1
3A	Tourists	1.7.2
3F	ALARM.EMERGENCY IDENTIFICATION	
40-7F	CONTENT	
40	Public affairs	
41	General Domestic	1.1.0
42	Legal and social	1.2.0
43	Economic, Industrial & Financial	1.3.0
44	Housing, environment & health	1.4.0
45	Communication	1.5.0
46	Educational & cultural	1.6.0
47	International relations & defence	1.7.0
48	Science & the humanities	2.0.0
49	Natural sciences	2.1.0
4A	Social sciencies	2.2.0
4B	Humanities	2.3.0
4C	Other sciences or humanities	2.9.0

continued on following page

50	Music	3.1.0
51	Serious	3.1.1
52	Light classical	3.1.2
53	Light	3.1.3
54	Jazz	3.1.4
55	Folk	3.1.5
56	Rock	
57	Other music	3.1.9
58	Drama, arts	3.0.0
5A	Ballet & dance	3.2.0
5B	Drama	3.3.0
5C	Literature/poetry	3.4.0
5D	Media affairs	3.5.0
5E	Painting, sculpture, architecture	3.6.0
5F	Other drama, arts	3.9.0
60	Philosophies of life	
61	Christian religion	4.1.0
62	Non-Christian religion	4.2.0
63	Non-religious philosophies of life	4.3.0
67	Other philosophies of life	4.9.0
68	Sports	5.0.0
69	Non-instrumental ball games	5.1.0
6A	Instrumental ball games	5.2.0
6B	Winter sports	5.3.0
6C	Water sports	5.4.0
6D	Racing and equestrial sports	5.5.0
6E	Athletics	5.6.0
6F	Martial arts	5.7.0
70	Leisure & hobbies	6.0.0
71	Do-it-yourself	6.1.0
72	Gardening	6.2.0
73	Tourism	6.3.0
74	Keep fit	6.4.0
77	other leisure or hobbies	6.9.0
78	Light entertainment, folklore and human interest	7.0.0
7A	Light entertainment	7.1.0
7B	Folklore/festivities	7.2.0
7C	Human interest	7.2.0
7F	Other light entertainment	7.9.0
80-FF	SERIES CODE	

This code table is based on the EBU classification system 'ESCORT see EBU document SPG 2353.

Figure 80 Programme Type and Series Codes

DEFINITION OF THE MAGAZINE INVENTORY PAGE.

This page is intended to be complementary to the FLOF (Fastext) Code of Practice, to enable an improved service to the viewer, without resort to higher levels of Teletext.

1) In order to ease the task of storage of pages in a multi-page decoder, a particular page number in each magazine should be set aside for transmitting an inventory page containing information for the decoder about the number of sub-pages, associated with each main page number, that are being transmitted in that magazine, at any given moment in time. The default page number will preferably be FE-3F7E. The page will not be mandatory, and may be transmitted at the discretion of the broadcaster.

2) A pkt.29 giving further information about the inventory page may also be transmitted at regular intervals. This packet would define the inventory page number (default FE-3F7E), or could define that no inventory page was being transmitted (FF-3F7F), in a similar manner to that used in other non-display packets. Other useful information would be a 16 bit CRC for the page, a repeat of the continuity indicator contained in the page, and possibly, the time at which the page was last updated (in pkt.8-30 format or similar).

3) Packet numbers 01 to 16 must always be transmitted for the index page in question, other packet numbers (17 to 28) should be reserved for future uses.

4) The data in packets 01 to 16 is related to the pages in the magazine by its position in the packet, and by the packet number. The data is conventional seven bit data with odd parity, transmitted least significant bit first, and is organised as sixteen pairs of bytes starting at byte six in each packet, through to and including byte 37. For ease of compatibility with 525 line systems, bytes 38 to 45 in each 625 line system packet would not have any defined content. The data in packet 01 refers to page numbers 00 to 0F, in packet 02, to pages 10 to 1F and so on. The byte pairs in each packet refer to ascending page numbers within each group of sixteen referred to by the packet, e.g. bytes 06 & 07 refer to page X0, 10 & 11 refer to page X2 and so on. The accompanying table shows the complete set.

5) The most significant bit of the fourteen data bits in each byte pair indicates if high, that there is further data elsewhere about the page number. How that data is transmitted is left open for future expansion.

6) The next most significant bit in each byte pair (shown in the diagram as "R"), informs the receiver whether the sub-pages referred to by that data, require additional storage space in the receiver or not. If set low, this bit would tell the receiver that the sub-pages should not be stored in separate locations, as to do so may affect the desired editorial effect, e.g. Oracle's index pages with different advertisements on each of several sub-pages, or pages with animated effects. If set high, this bit would inform the receiver that the sub-pages would best be stored separately, if the system has the capability, so that the viewer may read the pages at his/her own rate, rather than at the rate determined by the transmission system. This bit would therefore be editorially defined, as part of the page creation process.

Draft prepared to BVTFC 2-3-88

7) The other twelve bits of data in the byte pair give the number of sub-pages being transmitted for the page number referred to the byte pair. From hex. 000 to 800 the numbering is linear and gives the receiver the exact number of sub-pages to expect. When the most significant (of the twelve bits) is set, the weighting of all but the most significant bit is multiplied by three. Thus:

Bit value		Meaning
Hex.	Dec.	
000	0000	- there is no information for this page number, (the page may or may not be transmitted).
001	0001	- only one version of this page number is being transmitted, (sub-coded 0000).
002	0002	- two versions of this page number are being transmitted, (sub-coded 0001 & 0002)
		etc.
800	2048	- 2048,2049 or 2050 versions of this page are being transmitted. Sub-page numbering is not necessarily sequential.
		etc.
FFF	4095	- 8189, 8190 or 8191 versions of this page number are being transmitted.

Note; the boundary of non-linearity has been particularly chosen such that a page number containing 1440 versions, (one sub-page per minute of the day, the original intention of sub-codes), can be accurately described by the inventory page. While it seems unlikely that the BBC alarm clock page would ever need to be stored in a receiver, it may well be that some other form of timed transmission of data could find this facility useful.

8) Bytes 36 & 37 in pkt.16 may contain a 14 bit continuity indicator to indicate to the receiver that the data has changed.

9) The header (pkt.0) contents have no defined meaning at present, though data may in the future be transmitted in this packet.

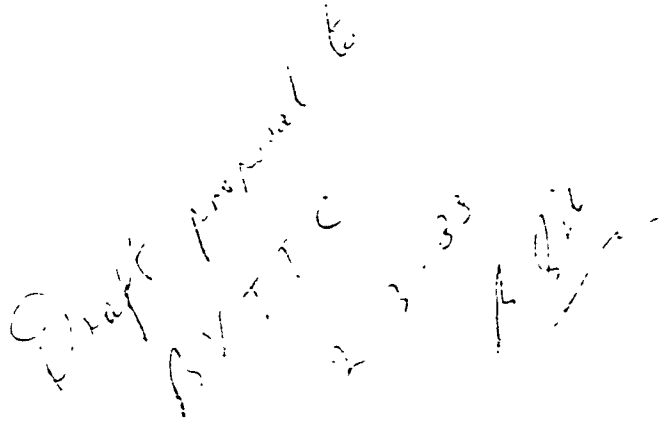


TABLE SHOWING FORMAT OF THE PROPOSED INVENTORY PAGE.

LINE BYTE NUMBERS

PKT	05	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38 to 45
01	00		01		02		03		04		05		06		07		08		09		0A		0B		0C		0D		0E		0F		Not defined
02	10		11		12		13		14		15		16		17		18		19		1A		1B		1C		1D		1E		1F		" "
03	20		21		22		23		24		25		26		27		28		29		2A		2B		2C		2D		2E		2F		" "
04	30		31		32		33		34		35		36		37		38		39		3A		3B		3C		3D		3E		3F		" "
05	40		41		42		43		44		45		46		47		48		49		4A		4B		4C		4D		4E		4F		" "
06	50		51		52		53		54		55		56		57		58		59		5A		5B		5C		5D		5E		5F		" "
07	60		61		62		63		64		65		66		67		68		69		6A		6B		6C		6D		6E		6F		" "
08	70		71		72		73		74		75		76		77		78		79		7A		7B		7C		7D		7E		7F		" "
09	80		81		82		83		84		85		86		87		88		89		8A		8B		8C		8D		8E		8F		" "
10	90		91		92		93		94		95		96		97		98		99		9A		9B		9C		9D		9E		9F		" "
11	A0		A1		A2		A3		A4		A5		A6		A7		A8		A9		AA		AB		AC		AD		AE		AF		" "
12	B0		B1		B2		B3		B4		B5		B6		B7		B8		B9		BA		BB		BC		BD		BE		BF		" "
13	C0		C1		C2		C3		C4		C5		C6		C7		C8		C9		CA		CB		CC		CD		CE		CF		" "
14	D0		D1		D2		D3		D4		D5		D6		D7		D8		D9		DA		DB		DC		DD		DE		DF		" "
15	E0		E1		E2		E3		E4		E5		E6		E7		E8		E9		EA		EB		EC		ED		EE		EF		" "
16	F0		F1		F2		F3		F4		F5		F6		F7		F8		F9		FA		FB		FC		FD		FE		CI		" "

Numbers in the table are the page numbers that the data in the byte pairs refer to (only for the magazine in which this page is transmitted). (CI = continuity indicator)

TYPICAL BYTE PAIR

2 x SEVEN BITS + PARITY

0 1 2 3 4 5 6 P | 0 1 2 3 4 5 6 P

$^{20}_{S1}$ $^{21}_{S2}$ $^{22}_{S3}$ $^{23}_{S4}$ $^{24}_{S5}$ $^{25}_{S6}$ $^{26}_{S7}$ $^{27}_{S8}$ $^{28}_{S9}$ $^{29}_{SA}$ $^{2A}_{SB}$ R E

Twelve bit binary number showing the number of sub-pages being transmitted under this page number.

P = 0 No space need be reserved.
P = 1 Reserve appropriate space.

E = 0 No further information
E = 1 Reserved for future enhancements

Plessey Semiconductors Ltd	
Cheney Manor, Swindon, Wilts, SN2 2QW	
TITLE	MAGAZINE INVENTORY PAGE DEFINITION.
SCALE A4	DRWN CRWL
DWG NO. \CRWL\IPD.DWG	REV ...
technology	userlib .....
date 1/MAR/88	sheet .. OF ..