International Computers Limited

User notice

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4802 7500 SYSTEM (1)

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CHAPTER 2 7500 HARDWARE

Section 2.1.1 The 7502 Processors

The 7502/01 MTP will be available only as a 16K byte system and for this purpos a new type number: 7512/0 Additional 8K bytes of store, has been introduced. 7512/02 is mandatory with 7502/01. The 7502/01 will only be capable of controlling up to 6 VT-2000 units and 4 HCP-60 units. Only a limited quantity of 7502/01 MTPs will be available.

The 7502/03 remains as a 12K byte basic MTP with the option of an additional 4K bytes of store enhancement (7512/00). The 7502/02 supports up to 8 VT-2000 units and 4 HCP-60 units.

C1598/00 enables conversion of a 7502/01 with 7512/02 to a 7502/03 with 7512/00 The conversion provides an enhancement of a 7502/01 system to control 7 or 8 VT-2000 units.

The features F1930/00 Terminal Self Tester and F1945/00 Unclocked Modem Facilit have been removed from the list of options since both will be supplied as standard items within the basic 7502 MTP.

Sections 2.1.1 and 2.1.2

The list of approved OEM Modems is now out of date and incomplete. Advice on currently approved modems may be obtained from Regional Systems and Technical Support.

Section 2.1.2 The 7503 Processor

The maximum number of 7561/01 Video Terminals that can be connected to a 7503 is now limited to eight.

The 7513/1 4K byte store enhancement is no longer available and should be deleted.

Section 2.2.1 7500 Peripherals (Summary)

The 7561/1 Video Terminal is no longer available with a 960 character screen. The table entry for the VT-960 should therefore be deleted.

The HCP-60 hard copy printer (type number 7572/01) should be included in the table.

Section 2.2.8 7561/1 Video Terminal and Keyboard (VT-2000)

The list of 7502 VT couplers should be updated as follows:

7502 coupler	*Videos supported*	*Screen size (characters)*
F1936/00	1st, 2nd or 4th pair of 7561/01	2000
F1976/00	3rd pair of 7561/01	2000

The F1936/00 and F1976/00 couplers each cater for two 2000 character screen video terminals. F1976/00 must be used if more than two HCPs are required.

The F1935/1 and /2 couplers and the F1936/1 to /4 couplers should be deleted from the table.

The list of 7503 VT couplers should be updated as follows:

7503 coupler	*Videos supported*	*Screen size (characters)*
F1770/00	1	2000
F1772/00	Up to 2	2000

The F1769 and F1771 couplers should be deleted from the table.

Under the sub-section Characteristics note the following:

1 On the 7502 with F1775/00 VT keyboards the selection of code 1 or code 2 for the mainframe involved (see Appendix 2, note 2), is controlled by micro-switches set up at installation time and not as stated in the present text. These switches are interpreted by the TCP, which adjusts itself accordingly. Foreign language sets are catered for by modifications to the TCPs

2 The key reader will in future be referred to as the Personal Identification Device (PID) Reader.

The following Personal Identification Device will be supplied for use with the F1779/00 PID reader:

F1779/15 Pack of ten PIDs

The PIDs may be encoded with a fixed three digit decimal code giving a number in the range 000 to 250. F1779/15 will be supplied as a kit of parts together with instructions to make up ten PIDs to the user's choice in the secrecy of his own premises

Section 2.2.9 7572/1 Hard Copy Printer (HCP-60)

The following additional information should be added to the characteristics sub-section:

The HCP should have the language option corresponding to the character set on the VT units. Up to 6-part stationery may be used. However, trial printing should be performed for more than 3-part stationery to ensure that print quality and paper handling is satisfactory for that particular type of stationery before any bulk purchases of stationery are made.

Sections 3.1.5.2 and 3.1.5.3 (Programs T3A6K16 and T3A6K24)

Programs T3A6K24 and T3A6K32 will also support a straight magnetic cassette to magnetic cassette copy when a twin drive Magnetic Tape Cassette Unit (7542/2) is available.

Section 3.2 7503 T3Bx programs

The descriptions of the 7503 T3Bx TCPs should be updated as follows:

PROGRAM T3B1

T3B1 is the basic TCP capable of handling up to eight VT-2000 units and is designed to operate in the 7503 minimum store size of 16K bytes. The screen validation facility requires an additional 8K bytes of store.

PROGRAM T3B2

T3B2 provides control for up to eight VT-2000 units and up to four HCP-60 printers. The program requires 24K bytes of store.

Optionally, screen validation and/or hard copy formatting facilities may be incorporated into T3B2 at consolidation time. If both these facilities are required within one TCP, then an additional 8K bytes of store is needed.

PROGRAM T3B4

This program has been withdrawn since the 7503 processor can support only eight VT-2000 units.

PROGRAM T3B6

T3B6 provides control for up to eight VT-2000 units and up to 8 HCP-60 printers. The program requires 24K bytes of store.

Optionally, screen validation and/or hard copy formatting may be incorporated into the program at consolidation time. If either or both of these facilities are required, an additional 8K bytes of store is needed.

A summay of the T3Bx TCPs is given in the following table:

Terminal Control Program	*Maximum number of VT-2000 units*	*Maximum number of HCP-60 units*	*Store size for basic TCP(K bytes)*	*Store size for TCP with screen validation or hard copy formatting*	*Store size for TCP with screen validation and hard copy formatting*
T3B1	8	-	16	24	-
T3B2	8	4	24	24	32
T3B6	8	8	24	32	32

Configuration Summary: 7503 T3Bx Terminal Control Programs

Section 3.3 7502 T2Bx programs

The information in this section relating to the use of alternative hard copy printers should be updated as follows:

1 The alterantive printer will only be used for local output from the display (that is, hard copy printing and not direct output from the mainframe)

2 The alternative printer will be used under the following conditions:

(a) For T2B1: only when the original printer is inoperable

(b) For T2B2 to T2B5: when the original printer is inoperable or busy

(a) For T2B1: T2B1 attempts to use only the first alternative to the inoperable original

(b) For T2B2 to T2B5: an alternative printer may itself be assigned an alternative thus enabling a round robin of termiprinters if required

If no non-busy or operable printer can be found among the alternatives, the local output is queued. This is indicated by the illumination of both the LOCAL and the TYPE indicators. The TYPE indicator is extinguished when local output commences.

Sections 3.3.1 to 3.3.6

The description of the T2Bx TCP should be updated as follows:

PROGRAM T2B1

T2B1 is the basic TCP capable of handling up to eight VT-2000 units and up to four HCP-60 printers. The HCPs can only be used to take local hard copy from the video terminals. Screen validation, hard copy formatting and direct output facilities are not provided.

The program requires 12K bytes of store.

PROGRAM T2B2

T2B2 provides the same facilities as T2B1, but in addition allows direct output to the HCPs. The program requires 12K bytes of store.

PROGRAM T2B3

T2B3 provides the same facilities as T2B1, but in addition provides screen validation facilities. The program requires 12K bytes of store.

PROGRAM T2B4

T2B4 provides the same facilities as T2B1, but in addition allows hard copy formatting. The program requires 12K bytes.

PROGRAM T2B5

T2B5 combines the facilities of all the above T2Bx programs (that is, direct output, screen validation and hard copy formatting). The program requires 16K bytes of store.

Note that, if more than six VT-2000 units are in the configuration then a 7502/03 processor plus 7512/00 additional 4K bytes of store is required.

A summary of the T2Bx TCPs is given in the following table:

Terminal Control Program	*Store size required (K bytes)*	*Maximum number of VT-2000 units (see note)*	*Maximum number of HCP-60 units*	*Local hard copy output*	*Direct output*	*Screen validation*	*Hard copy formatting*
T2B1	12	8	4	Yes	No	No	No
T2B2	12	8	4	Yes	Yes	No	No
T2B3	12	8	4	Yes	No	Yes	No
T2B4	12	8	4	Yes	No	No	Yes
T2B5	16	8	4	Yes	Yes	Yes	Yes

Note: A 7502/01 will only support six VT-2000 units

Configuration summary: 7502 T2Bx Terminal Control Programs

The following new section should be added to the manual:

Section 3.4 T3D1 Terminal Control Program

The T3D1 program, works in conjunction with the 7503 Modular Terminal Processor (MTP) to provide a remote job entry facility for connection to 2900 Series mainframes running under VME/B. No off-line facilities are provided by this program.

Program T3D1 is the basic on-line bulk input/output program for 7503 MTPs connected to 2900 Series mainframes. The program supports card reader, line printer and a console device which may be a video console or a typewriter console. Feature numbers F1793/00, F1794/00 and F1795/00 (as defined in Appendix 1) should be specified for the typewriter console, video console and line printer, respectively. Magnetic tape cassette is mandatory, for program loading, but may not be used for data spooling. The program requires 24K bytes of store in the 7503 MTP.

Off-line data validation facilities are provided by the off-line program T3A3 in the T3A*x* series. Program consolidation procedures are as described for the T3A*x* programs (see Chapter 6 and the ICL 7500 Range publication *7503 Operating* (Preliminary Edition, TO 4801).

CHAPTER 4 7503 DATA VALIDATION PROGRAMS

Section 4.1.9 Format of input data cards

Note that a simple numeric field (type I) must be unsigned.

Section 4.1.12.1 Validation symbols

The validation symbol I- should be deleted from the list of processing options.

CHAPTER 5 VIDEO FACILITIES

Section 5.1.1 Display characteristics

7502 T2B*x* TCPs are to be enhanced to provide compatibility with the method of obtaining form feed on 7181/2 AVDUs.

Present versions of the TCPs translate all undisplayable characters (including form feed) sent by the main frame to a single internal code <SUB> (displayed as ■ on the VT screen).

Future T2B*x* TCPs will not translate form feed in this way, but will retain the code (0/12). Form feed will be displayed as § on the VT screen.

When hard copy output is initiated, the form feed characters will be passed on to the hard copy printer, causing form feed to take place at the required position.

Note also that a character containing a parity error is translated to <SUB>, and not to <DEL> as stated in the present text.

Section 5.1.2 Protected and unprotected fields

Amend note 2 on page 5-4 to read:

2 Where use is made of the 7500 screen validation facilities it is recommended that <DC3> (start unprotected flashing field) is not used, except to indicate an error (for example, where a field passes terminal validation but is rejected by the mainframe applications program)

Section 5.1.3 Output from the central system to the video terminals

In the message fromat <STX> *a b c d* <ETX>, *c* is the data to be displayed on the screen. This will normally consist of:

1 Cursor control and SOM positioning commands, as necessary

2 The data fields for display (for example, a formatted screen), including start protected field and start unprotected field characters, further cursor control codes, and newline codes, as necessary

Section 5.1.3.7 Video Terminal control sequences

The following notes should be used to qualify the summary of VT control sequences:

<ESC>3/5 clears screen, validation parameters, screen control modes and print formatting parameters.

<ESC>4/0 is a reset command which clears the screen and validation parameters but not the formatting parameters and screen control modes.

<ESC>4/1 This reset command (send at the end of a transaction sequence) causes a reset of the screen control modes and the screen validation and hard copy formatting parameters (see sections 5.2.2, 5.2 and 5.3.1) while allowing the formatting to apply to any hard copy that is taken of the last message of the transaction. The screen is not affected by this command.

The print formatting parameters are not cleared immediately upon receipt of <ESC>4/1 but are retained for use on any subsequent local output operation that may be initiated until either the operator presses the INTERLOCK and CLEAR SCREEN keys or a message not containing <ESC>4/1 is received. (A further message containing <ESC>4/1 is likely to be a repeat message.)

Since the validation parameters are stored within the screen (they do not take up a character position, neither are they displayed) <ESC>4/1 does not clear the validation parameters but causes validation to be inhibited. This inhibition is removed when an <IS4> code is received in a subsequent message (that is, validation is turned off immediately upon receipt of <ESC>4/1 and turned on again by a message which itself calls for validation).

Section 5.2 Screen validation

Note that a newline character is permissible in the first three types of field: alphabetic, alphanumeric and numeric.

Amend lines 6 and 7 on page 5-10 to read:

1 Whenever the operator has finished typing a field requiring validation and presses the TAB key, but not when the cursor is at the first display poisition of a field. (The exception allows the operator to TAB through several fields without involing the validation process)

Section 5.2.2.1 Specifying modes of operation

Add the following note to the end of this section:

3 Initially (and when reset by <ESC>3/5 or <ESC>4/1), the mode character has a setting as follows:

bits 2^0 to 2^5 = 0
bit 2^6 = 1

Section 5.2.2.2 Clearing a screen control mode character

Amend point 5 to read:

5 The central system transmits a special resetting sequence <ESC>4/1. The sequence allows a mainframe application program to reset the terminal to function like a 7181/2 system

Section 5.3 Hard copy output

Add the following text to the end of this section:

If a printer becomes inoperable during hard copy output, the remaining data is lost. It is necessary for the operator to reinitiate hard copy output once the inoperable condition has been rectified. When a printer is shared between several VT units, the reinitiated output may be physically separated from the previous incomplete output, since hard copy printing may have been intiated from other VT units, before the operator re-initiates the failed operation.

Section 5.3.1 Hard copy formatting

Amend option 6 to read:

6(a) Setting a condition flag if a field starts with a specified character string

(b) Selective printing of the current and subsequent fields depending on the setting of the condition flag

Section 5.3.1.1 Specifying hard copy formatting

Note that the format program *p* should not contain more than 127 ISO characters. (If the mainframe computer involved uses the shift system then the alpha, beta and delta shift characters should not be counted towards this limit since they will not appear in the resultant ISO characters transmitted to the terminal.)

Section 5.3.1.2 Formatting codes

The following extended description of the interpretation of the characters comprising a print formatting program addressed to a VT replaces the current text of section 5.3.1.2 up to the example.

PRINT FORMATTING PARAMETERS

When formatting local output, the print formatting routines in the TCP sequentially interpret the format program to produce the character string to be printed. The format program can request fields to be read from the associated VT and inserted in the output string.

These fields are read sequentially from the VT Start of Message position to the character before the cursor position, (line and frame wrap around occurring if necessary). Fields cannot be reordered or repeated on the printed output. Fields are delimited by SOM and cursor position and by any field separator characters (start and end unprotected field) stored on the VT screen, and may contain fixed or variable data.

Facilities to print fields, add various forms of non-displayed data and insert newline characters can be included in the format program. The print formatting routines are also aware of a single condition flag which can be set by testing the current VT field for specified initial characters. If set, this flag inhibits the action of certain formatting instructions. The flag is initially cleared and can also be explicitly cleared or inverted by the print program. The size of format programs is reduced by using a single level cycle facility and a multiple space facility.

PRINT FORMATTING CODES

The characters used to define a print format program are the ISO graphic codes 2/0 to 7/15 and the control code 1/1 (DC1). The graphic codes are interpreted as either format instructions or, following certain parameters, as text with normal character significance. A format program consists of a maximum of 127 characters (including text strings) and is started by <ESC>4/4 and terminated by the occurrence of <ESC>4/5. Note that no other <ESC> sequence may occur between these two.

Text strings are represented by *s* in the following format descriptions and may contain graphic codes 2/0 to 7/14.

The instruction codes 2/0 to 5/15 are reserved for use as counts in perform loops and multiple space instructions. They represent the numbers 0 to 63 respectively and are signified by *n* in the following formats.

1 The following instruction codes cause a field, not including its delimiters, to be read from the VT screen and subsequent instructions to refer to following fields:

6/0 Omit field
6/1 Print field

The print action is inhibited if the condition flag is set

2 The following instruction codes control data insertion. They have no effect if the condition flag is set:

6/3 Print VT number (the VT numbers are 2 digit hexadecimal numbers commencing from 00 and are assigned in sequence to VTs in correspondence to their relative addresses)

6/4 Print Newline but not if the line just printed was all spaces

6/5 Print Newline

6/6 Print *n* spaces

6/7*s*<DC1> Print String *s* (terminated by <DC1>)

3 This instruction code sets the condition flag. It refers to the current VT field, that is subsequent instructions operate on the same field:

6/8*s*<DC1> Set condition flag if field begins with string *s* (terminated by <DC1>)

4 The following instruction codes affect only the condition flag:

6/9 Clear condition flag

6/10 Invert condition flag

5 A sequence of any of the instruction codes in 1 to 4, signified as *i*, can be performed *n* + 1 times using the following format (such cycles cannot be nested):

6/11*in*

that is, the following sequence 6/11 6/9 6/5 6/1 2/2 would print 3 fields on consecutive lines; *i* being in this case 6/9 6/5 6/1

6 This instruction code denotes the end of the format program:<ESC>4/5

Notes

1 Formatting parameters are not checked for validity, incorrect parameters will have an indeterminate effect on any subsequent output

2 Characters overflowing a print line are lost

3 Printing is terminated if an attempt is made to read the screen cursor

4 Any new lines required must be explicitly inserted in the format program

Section 5.3.1.2 (Print formatting example)

In the example on page 5-19 the total should be £4.76.

Section 5.4 Direct output to HCPs

The <DC1> or <DC2> character to release an HCP from direct output mode should not be sent as part of the text but should be in the second of two dummy blocks following the last text block. This will enable confirmation of satisfactory printing to be obtained before the HCP is released from direct output mode.

At the end of section 5.4 add the following warning:

A mainframe failure during direct output will leave the HCP involved locked in direct output mode. This should be taken into consideration during subsequent recovery procedures.

Section 5.4.1.2 Paper low

If the paper low condition occurs during the printing of the block containing <DC3>, the inoperable status will not be reported until a subsequent <DC3> has been received and actioned.

Section 5.4.2 Control characters

Note that the inner track of an HCP format disc is used for form feed and the outer track is used for vertical tabulation.

The second paragraph of the entry for <VT> (FE3) on page 5-23 should, therefore, read:

The VT character is followed by a numeral in the range 1 to 7 (ISO 3/1 to 3/7). A <VT> 3/1 sequence causes a throw to top of form (next hole in *inner* track of the format disc). Sequences <VT> 3/2 to <VT> 3/7 cause throws to the next hole in the *outer* track of the format disc.

The entry under <FF> (FE4) should read:

... (next hole in the *inner* track of the format disc) ...

Similarly, on page 5-24, the tracks referred to on lines 6 and line 9 should be "inner" and "outer" respectively.

Section 5.4.4 Message formats (for direct output)

Note that any alpha, beta or delta shift characters, used by the mainframe. do not count toward the message limit of 128 characters, since they are not transmitted to the terminal.

CHAPTER 6 OPERATIONAL CONSIDERATIONS

Section 6.1.2 TCP consolidation process

On page 6-2, under point 2 (middle of the page), note that a code table is also required for the VT and HCP.

Note 3, at the foot of page 6-2 should be amended to read:

3 Under T3A*x* TCPs the unit number given to the video console defines the code set to be used. The code selected depends upon the type of keyboard in use: F1728 (1900 Series character repertoire), F1729 (System 4 character repertoire) or F1794 (English standard character repertoire)

Unit number	*Defines*
0	1900 codes with F1728 keytops
1	System 4 or 2900 codes with F1729 or F1794 keytops
2	1900 codes with F1729 or F1794 keytops

Section 6.2 Teleload and Teledump

On 2903 only one dump file exists which can contain only one dump at a time.

Section 6.2.1 Monitoring TLD at the terminal

Note that the lowest addressed VT is used to monitor the 7502 Teleload process.

Section 6.4.1 Device addressing: 7503 systems

Note that HCP device addresses should start from hexadecimal 36 for T3B1 and T3B2, and from hexadecimal 46 for T3B6. (In the latter case addresses hex 36 to hex 47 are not used.)

CHAPTER 7 MAINFRAME SUPPORT

Section 7.1.1.1 1900 MPOE systems: support of 7503 T3A*x*

Note that a 7503 T3A*x* system can also be supported by a 7905 Communication Processor (but see section 7.5 for restrictions on such usage).

Support for 7503 T3A*x* is now provided only by the GEORGE 2 remote job entry program #XKVB operating via Communications Manager, or by user-written application programs interfacing to Communications Manager. Terminal spooling can only be used in conjunction with #XKVB.

Section 7.1.1.2 1900 MPOE systems: support of T3B*x* and T2B*x*

Note that T3B*x* and T2B*x* systems can also be supported by a 7905 (but see section 7.5 for restrictions).

Section 7.1.2.1 GEORGE 3 systems: support of 7503 T3A*x*

7503 T3A*x* systems can be connected to GEORGE 3 via 7920 or 7930 scanner-only systems or via 7903 or 7905 Communications Processors (but see section 7.5 for restrictions in the case of 7905). Support is provided either by GEORGE 3 directly, for remote job entry, or by a user written applications program via Communications Manager.

Program T3A1 can also be supported by character or message buffering housekeeping to provide compatibility with 7020 Remote Data Terminals.

The 7507/1 Video Console may now be used as an alternative to the 7506/1 Typewriter Console when a hard copy of console output is not required and the console is not subject to a sustained heavy or frequent peak workload. Any of the conditions below could contribute to a unacceptably high output rate resulting in some video console output being immediately overwritten:

1 Frequent system messages from GEORGE 3 (determined by the number of jobs under the control of the console and the number of files awaiting output to a device)

2 Frequent operator interrogation (the length of standard replies to operator command, for example WHATJOBS and WHATSTATE, is determined by the number of jobs under control and the number of peripherals used etc.)

3 Frequent use of spooling resulting in local messages created by the TCP (note that these are not generally repeated)

4 Use of MOP on operators console

Section 7.1.2.2 GEORGE 3: support of T3B*x*

T3B*x* systems can be connected via either a 7920 or 7930 scanner-only system, or via a 7903 or 7905 Communications Processor (see section 7.5 for 7905 restrictions).

Support requires the use of Communications Manager, except for those users who are running a 7503 merely as an extension of a 7181/2 system. Such users are permitted to use character or message buffering housekeeping.

Vidimop is available only in connection to a 7903 or 7905 Communications Processor (see also section 7.8.1).

Section 7.1.2.3 GEORGE 3: support of 7502 T2B*x*

Support is now provided by Communications Manager.

Section 7.1.4 1901T/2T I.V.C. systems

Only T2B*x* systems can be connected to 1901T/2T via the integrated VDU coupler. On systems not using the integrated VDU coupler, permissible connections are as for 1900 MPOE systems.

Section 7.3.1.2 Support of 7502 on 2903 systems

The following points on 2903 support of 7502 should be noted:

1 2903 requires ETS2 to support 7502 systems

2 The restriction on the number of video allowed has been lifted. Using BES ETS2 the total number of VTs supported is 16

3 Direct output is now supported by COBOL (but not by RPG2)

Section 7.9.3.2 GEORGE 3 and 4: support of Teleload and Teledump

Teleload and Teledump is now supported by Communications Manager on GEORGE 3 and 4.

Section 7.9.5 TLD on 2903 systems

Note that a single program (#XTLC) provides both Teleload and Teledump facilities on 2903.

APPENDIX 1 7500 RANGE EQUIPMENT LIST

Below is an updated list of 7500 equipment.

7502 equipment

Type number	*Mnemonic*	*Description*
7502/01	MTP2	Modular Terminal Processor with 8K bytes of store and line unit at 600, 1200, 2400 and 4800 bit/s (only limited quantities of 7502/01 are available)
7512/02		Additional 8K bytes of store (7502/01 only)
7502/03	MTP2	Modular Terminal Processor with 12K bytes of store and line unit at 600, 1200, 2400 and 4800 bit/s
7512/00		Additional 4K bytes of store (7502/03 only)
C1598/00		Conversion of 7502/01 (+7512/02) to 7502/03 (+7512/00)
F1931/00		Connector for UK Post Office Modems numbers 1, 7B and 7C
F1932/00		Connector for approved OEM Modems (see section 2.1.1)
F1933/00		Connector for TRT Sematrans Modems 1203, 2401, 4801
F1832/00		Direct connection (without modems)
7561/01	VT-2000	Video terminal and keyboard 2000 character screen
F1779/00		Personal Identification Device reader
F1779/15		Pack of ten PIDs
F1775/00		English Standard Character Repertoire on 7561/01 (1900, System 4, 2900 and 2903)
F1776/00		Swedish Standard Character Repertoire on 7561/01 (1900, System 4, 2900 and 2903)
F1777/00		Danish Standard Character Repertoire on 7561/01 (1900, System 4, 2900 and 2903)
F1936/00		Coupler for 1st, end or 4th pairs of 7561/01
F1976/00		Coupler for 3rd pair of 7561/01
7572/01	HCP-60	Hard copy printer, 60 character per second, 118 print positions, sprocket feed
F1785/00		English Standard Character Repertoire on 7572/01 (1900, System 4, 2900 and 2903)
F1786/00		Swedish Standard Character Repertoire on 7572/01 (1900, System 4, 2900 and 2903)
F1787/00		Danish Standard Character Repertoire on 7572/01 (1900, System 4, 2900 and 2903)
F1939/00		Coupler for up to 4 x HCP-60

7503 equipment

Type number	*Mnemonic*	*Description*
7503/01	MTP3	Modular Terminal Processor with 16K bytes of store and line unit at 600, 1200, 2400 and 4800 bit/s
F1824/00		Connector for UK Post Office Modems numbers 1, 7B and 7C
F1825/00		Connector for approved OEM Modems (see section 2.1.1)
F1826/00		Connector for TRT Sematrans Modems 1203, 2401 and 4801
F1827/00		Direct connection (without modems)
F1790/00		Unclocked Modem Facility
F1761/00		Extension cabinet
F1762/00		Additional power supply
7513/02		Additional 8K bytes of store for 7503/01
7506/01	TTC	Typewriter console (requires F1763/00 if not already specified)
F1763/00		Coupler for TTC and TPR
F1726/00		1900 Series code for TTC
F1727/00		System 4 code for TTC
F1793/00		2900 Series code for TTC
7507/01	TVC	Video console, 16 lines, 80 characters/line
F1764/00		Coupler for TVC
F1728/00		1900 code for TVC
F1729/00		System 4 code for TVC
F1794/00		2900 code for TVC
7527/00	TLP-150	Line printer, 132 print positions, up to 150 lines per minute
C1347/00		Conversion of TLP-150 to TLP-300
C1348/00		Conversion of TLP-150 to TLP-500
7527/01	TLP-300	Line printer, 132 print positions, up to 300 lines per minute
C1343/00		Conversion of TLP-300 to TLP-500
7527/02	TLP-500	Line printer, 132 print positions, up to 500 lines per minute
F1766/00		Coupler for TLP-150, TLP-300 or TLP-500
F1700/00		1900 Series standard print barrel
F1711/00		System 4 standard print barrel
F1795/00		2900 Series standard print barrel
F1712/00		Swedish print barrel
F1713/00		Russian Cyrillic print barrel (1900 Series)
F1714/00		Russian Cyrillic print barrel (System 4)
F1715/00		Danish print barrel
F1701/00		Special print barrel with up to 5 non-standard characters and/or rearrangement of standard 64 character set

Type number	Mnemonic	Description
F1702/00		Spare print barrel required when F1701/00 is ordered
7537/01	TPR-500	Paper tape reader, 500 characters per second (requires F1763/00 is not already specified)
7532/01	TCR-300	Card reader, 300 cards per minute
F1767/00		Coupler for TCR-300
7542/01	TMC	Single magnetic tape cassette unit (coupler included)
7542/02	TMC	Twin magnetic tape cassette unit (coupler included)
C1342/00		Conversion of 7542/01 to 7542/02
7561/01	VT-2000	Video terminal and keyboard 2000 character screen
F1779/00		Personal Identification Device reader
F1779/15		Pack of ten PIDs
F1775/00		English Standard Character Repertoire on 7561/01 (1900 and System 4)
F1776/00		Swedish Standard Character Repertoire on 7561/01 (1900 and System 4)
F1777/00		Danish Standard Character Repertoire 7561/01 (1900 and System 4)
F1770/00		Coupler for 1 x VT-2000
F1772/00		Coupler for 2 x VT-2000
7572/01	HCP-60	Hard copy printer, 60 character per second, 118 print positions, sprocket feed
F1785/00		English Standard Character Repertoire for 7572/01 (1900 and System 4)
F1786/00		Swedish Standard Character Repertoire for 7572/01 (1900 and System 4)
F1787/00		Danish Standard Character Repertoire for 7572/01 (1900 and System 4)
F1773/00		Coupler for 4 x HCP-60
7591/01		Console desk, type 1
7591/02		Console desk, type 2

APPENDIX 2 DATA TRANSMISSION CODES

The symbols below are not available under standard System 4 ISO to EBCDIC translation when using 7561/01 video terminal and keyboard, unless own code translation tables are generated within the CCP:

Symbol	Code
`	6/0
{	7/B
!	7/D

If received by the mainframe the codes will be translated to ♦ (Hexadecimal 'FF').

Codes 3/3 and 3/4 referred to in note 1, page A2-2, should read 2/3 and 2/4 respectively.

Publications notice

Technical Publication no.	Title (Notice no.)	Date
4802	7500 System (2) Issue 2	3/1/79

Issue 1 of Publications Notice 2 to the manual has been withdrawn and replaced by Publications Notice 8 . Notice 8 contains comprehensive summaries of current TEs, 7502 configurations , facilities and equipment and mainframe support. The 7502 Model 10 and ISO variants of the T2SAx terminal executives are introduced. After withdrawing issue 1 from the manual this front page should be filed with the manual as a record.

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User notice

PUBLICATION (NOTICE NO.)

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4802

7500 SYSTEM (3)

File one copy of this notice with each of the publications indicated

This user notice describes the facilities provided by the 7502 terminal executive listed below. Specific implementation details for the mainframe application programmer and support programmer are also given.

T2AD01	Application Development terminal system
T2AP11	Off-line Application Programming terminal executive
T2AS4	Application Support terminal executive (mainframe to terminal transmission)
T2AS5	Application Support terminal executive (terminal to mainframe transmission)
T2IP01	Interactive and Remote Printing terminal executive

Additional information on these terminal executives will be found in the ICL publications *TPL Application Programming* (Edition 1, TP4809) and *7502 Operating* (Edition 1, TP4804).

Application Program development, using T2AD01, is fully described in *TPL Application Programming*. The publication will also be of interest to anyone requiring detailed information on the features and facilities of TPL Application Programming.

Operating information for the terminal system and the terminal executives is given in *7502 Operating*.

CONTENTS

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7502 Application Programming and Terminal Programming Language (TPL)

Application Programming is a method of tailoring the 7502 terminal's processing to meet specific user requirements. It is based upon ICL's new *Terminal Programming Language* (TPL). Terminal executives T2AP01 and T2AP11 provide, respectively, on-line to mainframe and off-line support for Application Programming. The development system T2AD01 provides the user with the means of developing Application Programming systems at the 7502 terminal. T2AS4 and T2AS5 provide supporting transmission facilities.

T2AP01, which provides facilities for on-line Application Programming, will be described in subsequent publications. The capabilities of the other above mentioned terminal executives are described below.

The development system, T2AD01, enables the user to write sequences of TPL instructions (called *Action Routines*) to perform a wide range of screen processing activities. These Action Routines are stored in a diskette file and subsequently called, during run time operation, under T2AP01 or T2AP11, to process data keyed in by video operators. The range of activities that can be performed using TPL Action Routines is wide. However the same basic principle is employed: each field into which the video operator keys data may have an Action Routine associated with it. This Action Routine specifies what processing is to be performed on that field. The Action Routine may make use of further data (held in *reference files* on diskette, or held in *tables* in store), thus allowing the data keyed in by the operator to be checked or supplemented. (Reference files and tables are described in more detail below.)

T2AD01 is also used to design the *screen formats* into which the video operators will key data at run time, and to produce tables, which hold small quantities of information frequently used at run time.

A related set of screen formats and their associated Action Routines and tables are collectively known as the *user's path library file*. Any number of path libraries can be developed using T2AD01 to cater for a variety of user's applications.

T2AP11 allows up to four video terminal operators to key data into the screen formats previously created by T2AD01. The user's TPL Action Routines are automatically invoked to process the keyed-in data in the manner specified. Under control of T2AP11, the record prepared by the Action Routines is stored on diskette for subsequent transmission to the mainframe.

As mentioned earlier, Application Programming allows the use of reference files, held locally on diskette, to provide supplementary data during run time operation.

A reference file consists of a set of records, each record having a key field. For example, in an order entry system, a reference file could be created containing customer details: name, address, credit limit, etc., with the customer's reference number as the key for each record. During run time operation, the operator need enter only the customer reference number to cause full customer details to appear on the screen. The method thus saves keying-in time, provides additional information for the video operator and, as in the example above, provides a useful cross check that the displayed data tallies with the source document.

Reference files are created at the mainframe, typically from a larger data base, and transmitted to the 7502 terminal, using the transmission facilities described below. Records should be submitted by the user in ascending key sequence. Reference file records are accessed via TPL at run time by requesting a record with a particular key.

T2AS4 and T2AS5 terminal executives provide facilities for terminal file transmission between mainframe and 7502.

Reference files are transmitted from the mainframe to the 7502, with the 7502 operating under the control of terminal executive T2AS4. Files containing data keyed in by the video operators during run time operation under T2AP11, are transmitted to the mainframe by T2AS5.

T2AS4 and T2AS5 have a further use in allowing *teledistribution* of path library files: a user's path library file developed at one 7502 terminal site may be distributed to other 7502 terminal sites by first transmitting the file to the mainframe, using T2AS5, and then transmitting it to other 7502 terminal sites requiring that particular path library, by using T2AS4.

The facilities for developing and using Application Programming based on TPL

are sufficiently flexible to allow its use in a wide variety of situations. On the smallest scale applications can be developed and used at a single 7502 terminal. On a much larger scale, with many terminals involved, a 7502 can be dedicated to the development of Application Programming, with teledistribution of path libraries to other 7502 terminals used for operational work.

Interactive and remote printing terminal executive

A number of applications require a terminal system to support a combination of interactive and remote printing facilities. Terminal executive T2IP01 supports on-line interactive use of up to six videos with concurrent use of a 7525/02 Line Printer. The 7525/02 provides printing speeds of up to 300 lines per minute. Any of the interactive videos can be converted into a control console by insertion of a condole DID (Personal Identification Device) into the PID reader on the appropriate video.

Full descriptions of the T2IP01 terminal executive and the 7525/02 Line Printer are given in sections 2 and 4 respectively of this notice.

TERMINAL EXECUTIVES — SECTION 2

T2AD01 terminal system

Purpose

T2AD01 provides facilities for the development and maintenance of screen formats and TPL action routines for use under T2AP01 or T2AP11 terminal executives. Full information on the facilities and method of use of T2AD01 is contained in the ICL publication *TPL Application Programming* (Edition 1, TP4809).

Note: T2AD01 is not strictly a terminal executive but consists of the following items held on diskette:

1 A terminal executive base: T2AP11, tailored for use in this mode

2 The development system path library file (including the *Create, Library, Tidy Library* and *Sizing Packages* which are described fully in the publication *TPL Application Programming*)

Mode of operation

Off-line.

Peripherals supported

One 7561 video with PID reader
One 7551/12 Dual Floppy Disc Drive
One hard copy printer (HCP-45, HCP-60 or HCP-180)

Store size required

28K bytes of 7502 store

T2AP11 terminal executive

Purpose

T2AP11 allows run-time, off-line execution of the user's screen processing application, developed using T2AD01. Data keyed in by video operators is processed by TPL action routines and stored in a diskette file. The file may be subsequently transmitted to the mainframe by use of terminal executive T2AS5.

Mode of operation

Off-line.

Peripherals supported

Up to four 7561 videos, optionally with PID readers
Up to two hard copy printers (HCP-45, HCP-60 or HCP-180)
One 7551/12 Dual Floppy Dis Drive

Store size required

28K bytes of 7502 store

Note: In some cases 40K bytes of store may be advisable so as to provide greater store availability for each application and to help to reduce the sizing constraints placed on applications using 28K systems. (It is planned to provide detailed sizing information with each release.)

T2AS4 terminal executive

Purpose

The T2AS4 terminal executive provides facilities for transferring the following types of files from mainframe to 7502:

1 Reference files

2 Application programming path library files

Mode of operation

On-line to a suitable mainframe system

Peripherals supported

One 7561 video with PID reader, for use only in console mode
One 7551/12 Floppy Disc Drive

Transmission method

XBM procedures at line speeds of up to 9600 bps using the UK ISO 7-bit transmission code.

Store size required

28K bytes of 7502 store

Device addresses

The following addresses are assigned to the peripherals used:

Device	*Address (in ISO code)*
Video in console mode	2/2
Floppy disc drive	2/15

T2AS5 Terminal executive

Purpose

The T2AS5 terminal executive provides facilities for the transfer of the following types of files from 7502 to mainframe:

1 Reference files

2 Application programming path library files

3 Spool files containing data entered off-line under T2AP11

Mode of operation

On-line to a suitable mainframe system.

Peripherals supported

one 7561 video with PID reader, for use only in console mode
One 7551/12 Floppy Disc Drive

Transmission method

XBM procedures at line speed of up to 9600 bps using the UK ISO 7-bit transmission code

Store size required

28K bytes of 7502 store

Device addresses

The following device addresses are assigned to the peripheral used:

Device	*Address (in ISO code)*
Video in console mode	2/2
Floppy disc drive	2/14

T2IP01 terminal executive

Purpose

T2IP01 supports the following combination of facilities:

1 Interactive use of videos

2 Remote printing from mainframe to line printer

Mode of operation

On-line to a suitable mainframe system

Peripherals supported

One 7561 video with a PID reader, for use as a console or as an interactive device.

Up to five further 7561 videos, optionally with PID readers, for use as interactive devices.

One 7525/02 Line Printer

Transmission method

XBM procedures at line speeds of up to 9600 bps using the UK ISO 7-bit transmission code.

Store size required

16K bytes of 7502 store.

Device addresses

The following device addresses are assigned to the peripherals used:

Device	*Address (in ISO code)*
Video in console mode	2/2
Videos	3/0, 3/1, 3/2, 3/3, 3/4 and 3/5
Line Printer	6/0

Any of the videos can be made to operate in console mode by insertion of a console PID. When this is done the address of the video effectively changes from a value in the range 3/0 to 3/5, to a value of 2/2. To the mainframe this appears as device 3/1, say, becoming inoperable and device 2/2 becoming operable.

While a console PID is inserted the video is not available for normal interactive use. When the console PID is removed the video reverts to its original state and the console becomes inoperable. The console PID may then be inserted in another video which then becomes the console.

Facilities

T2IP01 provides facilities for normal on-line interactive use of up to six videos. At the same time, the 7525/02 Line Printer can be used as a remote printer. Any one of the six interactive videos may be converted (by insertion of a console PID) into a control console, to control the remote printing operation.

The interactive facilities supported are as described in Chapter 5 of the manual, except for screen validation and hard copy output/formatting which are provided by T2IP01.

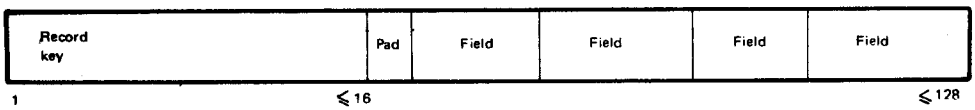
The remote printing facilities are described in section 4 of this notice.

FILE TRANSMISSION — SECTION 3

Reference file creation and transmission

Records for reference files required by T2AP01 and T2AP11 are assembled at the mainframe and subsequently transmitted to the 7502 terminal by an ICL-supplied utility or user-written application program. The terminal should be loaded with terminal executive T2AS4.

The user supplies reference file records, in the format described below, together with data to enable file header and file trailer records to be created. The records must be arranged into ascending key sequence. Key values need not necessarily be contiguous. Key sequencing must be in accordance with ISO-7 codes. (A table of ISO-7 codes is given in Appendix 2 of the manual.) Twenty-six reference files records are held per track on diskette. When calculating the file size required, an overhead of approximately 10% should be added to allow for the record index on the diskette.



Reference file record format is shown above. The format and size of records and fields within a reference file may be chosen by the user, subject to the constraints listed below:

Item	*Constraint*
Record length	2 to 128 characters (even values only)
Key length	2 to 16 characters (even values only)
Field length	1 to 80 characters

Once the user has selected a particular record size and record format, the same size and format must be used throughout the file. The position and size of each field in the record is specified to T2AD01 during the development stage (see *TPL Application Programming* (Edition 1, TP4809), sections 2.1.3.1, 3.1.1.3 and 3.2.8), so that the fields can be accessed via TPL action routines.

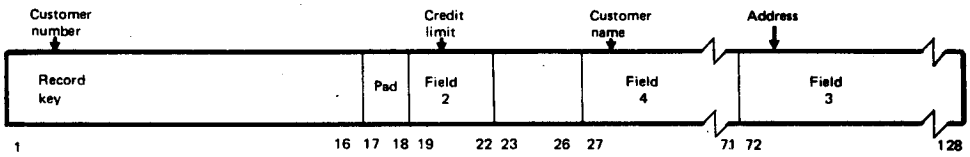
The first field of each record should be the record key, identifying the contents of the record. All records within a file should be submitted in ascending order of key value. The key value is as accessible as any other other field, that is, its key function is additional to its field attributed.

A two character pad field, containing the value 1/15, 1/15 should separate the key field from the ramaining fields.

Fields other than the key field may overlap.

Except for the 'Pad' field, only codes for displayable data should be used, that is, codes in the range ISO 2/0 to 7/15.

An example of a reference file record is shown below:



Spool file transmission

Under T2AP11 data keyed in by the operator is stored in a diskette file. The spool file may then be transmitted to the mainframe by using T2AS5.

The user specifies the order in which the data is to be transmitted to the mainframe during path development (see *TPL Application Programming* (Edition 1, TP4809), section 2.3.1.2). The following options are available:

1 Data is batched by video

2 Data is batched by path by video

With option 1, output from each video is written to a unique sub-file of the spool file. The data is then transmitted in the following order:

$d_1, d_2, \ldots, d_n$

where

d_1 is the data from the video with the lowest-numbered identifier

d_2 is the data from the video with the next lowest-numbered identifier

Where option 2 is specified, output from each video is written to a unique sub-file and then transmitted in the following order:

$a_1, a_2, \ldots, a_n, b_1, b_2 \ldots, b_n, \ldots$

where

a_1 is path A data from video 1
a_2 is path A data from video 2
b_1 is path B data from video 1
b_2 is path B data from video 2

and so on.

SPOOL FILE FORMAT

The spool file is made up of variable length records up to 2012 characters (bytes) in the following format:

video identifier <IS4> *PID identifier* <IS4> <IS2> *record identifier data* <IS2>

The significance of each field is as follows:

Field	*Description*
video identifier	A three-character field encoded in the form: 4/*p* 4/*q* 4/*r* identifying the video number from which the message originated (see note 1). *pqr* together form a 12-bit binary value in the range 0 to 4095, with *p* comprising the most significant four bits. Thus video number 327 would be encoded as 4/1 4/4 4/7
PID identifier	A two-character field encoded in the form: 4/*s* 4/*t*

Field	*Description*
	identifying the PID value present in the reader of the video from which the message originated (see note 2). *st* together form an 8-bit binary value in the range 0 to 250, with *s* comprising the most significant four bits
record identifier	A three-character field encoded in the form: *ann* identifying the path from which the video data originated: *a* is an alphabetic path identifier in the range A to T and *nn* is a number in the range 01 to 31
data	Up to 2000 characters of data from the screen in the form: <ISl> *text* <ISl> *text* <ISl> ... <ISl> *text* <ISl> where each *text* field contains the text from a field on the video screen (see note 3). Trailing spaces and trailing blank fields are not suppressed

Notes

1 The video number is either the value assigned by the terminal operator using the IV command (see *7502 Operating* (Edition 1, TP4804), User Notice 2), or, if this is not done, the default value assigned automatically by the terminal executive (the lowest numbered video is assigned the value 1, the next lowest video is assigned the value 2, etc.)

2 The whole field <IS4> *PID identifier* <IS4> is omitted from the spool file record of the video from which the record originated if the video either:

(a) did not have a PID inserted in the PID reader

or

(b) did not have a PID reader

3 The user controls which fields are included in *data* (and hence which fields are transmitted to the mainframe) by means of the TPL SEND verb (see *TPL Application Programming* (Edition 1, TP4809), section 4.1.13). It is possible to have a record with no data from the screen in which case there will be no *data* portion

Path library file transmission

Under control of terminal executive T2AS5, path library files may be transmitted to the mainframe where they are stored in mainframe files. These files may be subsequently transmitted to other 7502 terminals, using T2AS4, for storage on diskette.

It is not necessary to know the format of these files.

7525/02 LINE PRINTER

SECTION 4

The 7525/02 Line Printer is a free standing unit consisting of barrel printing and paper feed mechanisms, control electronics, ribbon drive, stationery hopper and free fall stacker tray, an operator's control panel and controls for vertical positioning of the stationery and print phasing. Paper movement is controlled by the Terminal Executive as a function of the transmitted control information. It is provided with a coupler for connection to the 7502/05 and is sited adjacent to the 7502.

The 7525/02 has the following characteristics:

Printing Speed	300 lines per minute (maximum)
Print positions	132

Repertoire	64 (including space character)
Type font	ECMA 11 OCR-B Size 1 (second edition)
Character pitch	10 character per inch
Line pitch	6 or 8 lines per inch under operator control
Format control	Via software (see below)
Throwing speed	15 inches per second
Stationery dimensions	Width: Min 102mm (4.0 inches) Max 508mm (20.0 inches) Length: Min 152mm (6.0 inches) (between folds) Max 559mm (22.0 inches)
Stationery type	Single or multipart (up to 6 parts)
Ribbon	Nylon or silk Length: 21.9 metres (24 yards) Width: 50.8mm (2.0 inches)
Hopper capacity	245mm (10.0 inches) high
Stacker capacity	127mm (5.0 inches) maximum height

The printer uses a standard English character repertoire, irrespective of mainframe. Mainframe code differences are cated for by terminal software, as a function of terminal hardware parameters or overriding operator commands. The character set and code translations to ISO-7 code are given in the following section.

The printer can alternatively be supplied with a Danish or Swedish national standard character repertoire, or with a non-standard repertoire with one non-standard character and/or any re-arrangement of the 64 character set.

A format loop to control vertical paper movement is not used with this printer. Instead a format loop is emulated by a stored representation of a physical format loop. This provides head of form and up to seven vertical tabulation positions. Full details of how to set up and use a software emulated format loop are given under *Controlling paper movement.*

Line printer data

Line printer data is converted from ISO-7 code to the printer graphics shown in the table below.

In addition to the printer graphics, the following format effector (FE) control characters may be included in the data to control paper motion:

Character	*Code*	*Function*
HT (FE1)	0/9	Indicates a horizontal tabulation of 1 to 63 print positions as specified by the qualifier character immediately following the HT character. The qualifier is a code in the range 4/1 to 5/15, 2/0 to 3/15. 4/1 to 5/15 corresponds to tabulations of 1 to 31 print positions; 2/0 to 3/15 corresponds to tabulation of 32 to 63 print positions. The qualifier is not printed
NL (FE2)	0/10	Initiates a combined paper feed of one line and resets the printing position to position 1
VT (FE3)	0/11	Initiates a combined vertical paper throw and reset of printing position to position 1. The VT code is immediately followed by a qualifier character in the range 3/1 to 3/7 indicating which track of the emulated format loop should be used (see section 5.4). The action of VT 3/1 is identical to FE4, form feed, described below. The qualifier is not printed. (See below for default action)
FF (FE4)	0/12	Causes a paper throw to the top of the next form and reset of print position to position 1. If paper is at the top of the form then a complete form length is thrown. Form feed action is also initiated by VT 3/1 described above. (See below for default action)
CR (FE5)	0/13	Resets the print position 1 without advancing the paper thus enabling overprinting

2900 mainframes use a vertical position and multiple newline method of tabulation instead of the format loop emulation method used by other ICL mainframes. When a 2900 mainframe is specified (by means of a CT 2 command from the terminal operator) the following code interpretations apply:

Character	*Code*	*Function*
HT (FE1)	0/9	The qualifier is treated as a code in the range 2/0 to 7/F corresponding to tabulations of 0 to 95 print positions
VT (FE3)	0/11	Initiates a paper throw (and reset of printing position) to the line number specified by the qualifier following the VT character. The qualifier is a code in the range 2/0 to 7/F. 2/1 to 7/F correspond to line numbers 1 to 95. The action of VT 2/0 is identical to form feed (FE4)
ESC,A	1/B, 4/1	Initiates a paper throw (and reset of printing position) of the number of lines specified by the qualifier character following. The qualifier is a code in the range 2/0 to 7/F corresponding to throws of 0 to 95 lines.

The form length and vertical tabulation markers are defined by means of a format loop specification as described in the next section. In the absence of such data a terminal default loop with head of form only is assumed as described later under *Default loop*. Under these conditions VT 3/1 and FF cause a throw to head of form as specified by the default loop, VT 3/2 to VT 3/7 cause a single line feed.

b7 → / b6 → / b5 → / BITS					0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
b4	b3	b2	b1	Column / Row	0	1	2	3	4	5	6	7
0	0	0	0	0			SPACE	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	HT		)	9	I	Y	I	Y
1	0	1	0	10	NL		*	:	J	Z	J	Z
1	0	1	1	11	VT		+	;	K	[	K	[
1	1	0	0	12	FF		,	<	L	$\\	L	$[\
1	1	0	1	13	CR		–	=	M	]	M	]
1	1	1	0	14			.	>	N	^	N	^]^
1	1	1	1	15			/	?	O	_	O	_

Notes

1 Three characters are shown in some boxes to take account of mainframe code differences. They are given in the following order:

Column 1	*Column 2*	*Column 3*
1900 and 2903	System 4	2900

2 The space character (ISO 2/0) is not physically present on the print barrel

3 Column 0 shows the applicable control codes, described earlier in this section

Controlling paper movement

A physical format loop is not used by the 7525/02 printer. Instead a stored representation of a conventional format loop is used.

This software emulated format loop is specified by means of a device control string containing a *format loop specification*. The device control string forms the first record of each print file sent to the printer. The contents of the device control string is used by the terminal system but is not printed.

On some mainframe systems format loop specification data is set up from parameters supplied to the controlling software (for example, 1900 Communication Manager). In these circumstances users should consult information given in the relevant manual for the mainframe concerned, rather than that given in this section.

Also, some mainframe systems permit the terminal operator to key in a console command requesting the mainframe to send a particular format loop (see relevant mainframe publications for further details).

SPECIFYING A FORMAT LOOP DEVICE CONTROL STRING

The device control string should be constructed as follows:

1 A string delimiter indicating the start of a device control string

2 A mode switch command code

3 A form length specifier

4 One or more track markers

5 A graphic string, consisting of a graphic terminator followed by up to 39 graphic characters, identifying the particular format loop specification

6 A string terminator

The contents and significance of these fields are described in the following sections. Certain fields are optional, with default values assumed when they are omitted (see *Optional fields* below).

Device control string delimiters

The encoding of these delimiters is as follows:

ISO-7 code	*Significance*
ESC 5/0	Start of device control string
ESC 5/12	String terminator

Any remaining data in the first record following the string terminator will be discarded.

Mode switch command code

This command code is used to set *Mode A* (vertical format control by format loop), that is, the method of control of printers connected to 1900, System 4 and 2903 mainframe systems.

ISO-7	*Significance*
5/0	Identifies subsequent data as being for vertical format control of paper by format loop

Form length specifier

This field is used to specify the form length in lines and consists of two ISO characters encoded as follows:

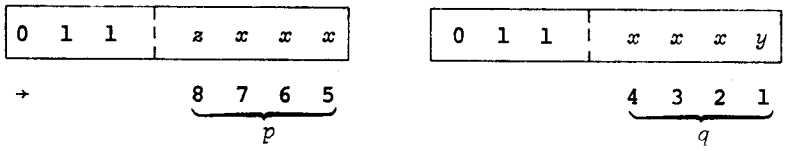
4/*p* 4/*q*

The form length should be encoded as an 8 bit binary value in the lower quartets *pq*. (The value 4 in the upper part of each ISO character identifies these characters as a form length specifier.)

The maximum form length permissible is 96 lines.

Track markers

Track markers are used to specify the positions of vertical tabulation stops. A track marker consists of two ISO characters 3/*p* 3/*q* encoded as follows:



The relationship of bits to the tracks of a conventional format loop are shown above.

The first track marker corresponds to the first line on the form (that is, head of form) and thereafter each subsequent track marker present corresponds to lines 2, 3, 4, etc. on the form. The number of track markers must not exceed the number of lines on the form but may be less in certain circumstances, as described in the section *Optional fields* below.

The bit settings in an individual track marker indicate whether or not tabulation stops occur on that line and, if so, for which tracks.

y may be 1 in the first track marker, corresponding to head of form, but must be zero in all subsequent track markers. The *y* bit corresponds to track 1 on a conventional format loop.

x bits correspond to tracks 2 to 7. An *x* bit should be set to 1 whenever a tab stop is required for that particular track and line. For example, if a tabulation stop is required for track 2 on the tenth line of the form, then the tenth track marker should be set to ISO 3/0, 3/2, that is:

z is reserved and should be set to zero in all track markers.

Graphic string

A graphic terminator followed by up to 39 graphic characters may be used as a graphic identifier for a loop.

Only ISO-7 codes from 5/0 to 7/15 may be used as the graphic terminator. Any code from 2/0 to 5/15 is permissible as a graphic character.

Default loop

When the terminal executive is first loaded a standard default loop of 66 lines with head of form only is assumed. A default other than 66 lines may be specified by operator command, thus catering for installations that regularly use non standard length forms.

The standard or operator-specified default is overridden by a user-specified format loop sent from the mainframe. This working loop is used until one of the following occurs:

1 The end of the print file is reached (that is, until detection by the terminal executive of a DC2 control character

2 The terminal executive is reloaded

If the latter occurs following a major failure then it will be necessary to carry out a restart procedure. The first action of a restart must be to re-output the required format loop specification data. In many cases this will involve restart from the beginning of the print file.

An operator-specified form length has no immediate effect if a user-specified format loop is in operation but will take effect when the end of the print file is reached.

Optional fields

Within the format loop device control string general format, that is:

ESC 5/0, 5/0, *form length specifier, track markers, graphic string,* ESC 5/12

the variable fields are optional. The effect of omitting the form length specifier and/or track markers is described below. The omission of the graphic string has no effect other than to make identification of the device control string more difficult.

Option		*Effect*
Form length	*Track markers*	
omitted	omitted	The default loop (as described above) will be used
omitted	present	A format loop with form length corresponding to the number of track markers specified will be used. The numbers of track markers present must, therefore, correspond to the number of lines on the form in use
present	omitted	A format loop with the specified form length and head of form marker only will be used
present	present	Form length and track markers are specified. It is only necessary to include track markers up to and including the last one with a significant marker set (that is, a 1 in track positions 2 to 7)

ICL International Computers Limited

User notice

PUBLICATION (NOTICE NO.)

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File one copy of this notice with each of the publications indicated.

This user notice describes the facilities provided by the terminal executives listed below. Specific implementation details for the mainframe application programmer are also given.

T2AP01 On-line Application Programming terminal executive
T2C6 On-line interactive terminal executive

Application program development, using T2AD01, is fully described in TPL Application Programming (Edition 1, TP4809). Operating information for the terminal system when using these terminal executives is given in 7502 Operating (Edition 1, TP4804), User notice 5.

This user notice also gives information relating to some of the topics covered in User notice 3 to this manual. Additional information is given on formats for file transmission; further device control characters for the line printer are given; T2UxI terminal executives are covered; and some corrections are included.

CONTENTS

SUMMARY OF ENHANCEMENTS — SECTION 1

On-line terminal executives T2AP01 and T2C6

T2AP01 and T2C6 terminal executives provide facilities for interactive use of up to four video terminals operating on-line to a mainframe system that supports XBM line control procedures. Up to four hard copy printers may also be used for local hard copy output and a Dual Floppy Disc Drive is required to hold the necessary files. Both terminal executives require screen formats to be held locally in a diskette file. This facility reduces the transmission overheads otherwise encountered when screen formats are transmitted from the mainframe as is the case with, for example, T2C5. In addition T2AP01 allows TPL action routines, also held on diskette, to be associated with the various fields of the screen format and interaction between any chosen field and the mainframe can take place during such action routines. T2AP01 also allows hard copy printers to be used for direct output from the mainframe.

Screen formats for use by T2C6 or T2AP01 are produced using the facilities of the Application Development System (T2AD01). These facilities are described in the ICL publication *TPL Application Programming* (Edition 1, TP4809).

T2C6 and T2AP01 allow the screen formats to be retrieved from diskette and displayed on the video screens (a process termed loading). The usual order in which the screen formats are presented to the video operator is established at the development stage, when the formats are created, using T2AD01. This inbuilt order may, however, be overridden by mainframe command, or by TPL in the case of T2AP01.

Once a format has been loaded additional information transmitted from the mainframe may be inserted into specified fields in the displayed format prior to data insertion by the operator. The mainframe may also insert information as a response to a previous enquiry to the mainframe from the operator.

Whereas T2AP01 and T2C6 allow data from completed screen formats to be returned to the mainframe under action of the SEND key, T2AP01 additionally permits manipulation of screen data using TPL Action Routines previously developed using T2AD01. T2AP01 thus provides full use of the TPL Application Programming facilities with flexible control via SEND Action Routines and the SEND verb, of data prior to transmission.

Screen formats developed under T2AD01 without associated action routines can be used by either T2AP01 or T2C6 with complete compatibility.

Section 2 describes in detail the facilities provided by T2AP01 and T2C6. Sections 3 and 4 describe the formats of the commands and responses that pass between the mainframe application program and the terminal system.

T2AP01 AND T2C6 FACILITIES — SECTION 2

Both terminal executives provide facilities for loading screen formats from local diskette to be filled in by the operator. The mainframe has the ability to control the sequence of formats displayed as well as displaying additional text to the operator by priming the format following a successful load. In addition, under T2AP01, the mainframe may interact with the operator during the completion of a format field and supply text strings in response.

Fields from the completed form are transmitted to the mainframe as follows:

1 T2C6 On pressing the SEND key T2C6 selects for transmission those fields that have previously been identified at the development stage for transmission. (Using the *Transmit* option on the field definition display as described in *TPL Application Programming*, section 3.2.16).

2 T2AP01 If a SEND Action Routine has been defined at the development stage data transmission to the mainframe is under control of the SEND verb. Data from the screen will be selected for transmission as specified at the development stage using the *Transmit* option on the field definition display (see TPL Application Programming, section 3.2.16). Parameters to the SEND verb may be used to limit the fields transmitted to a subset of those marked as transmit. If no SEND Action Routine is specified then the action is as for T2C6 described above.

T2C6 provides a sub-set of the facilities provided by T2AP01. T2C6 supports all but two of the set of commands (END PATH and CONTINUE) and command responses described in section 4. Since T2C6 does not support TPL application programming it is only able to return the content of complete formats as described above, whereas T2AP01 permits transmission of individual fields.

Basic Mode and Application Mode

Both T2C6 and T2AP01 enable each video terminal (VT) to operate in either of two modes, Basic Mode or Applications Mode. Switching between modes is achieved by commands from the mainframe application program. A video operator can also force entry to Application Mode by pressing LOCAL INPUT, typing PC and pressing SEND, and to Basic Mode by pressing INTERLOCK with CLEAR SCREEN.

In Basic Mode both terminal executives will behave like a T2C5 terminal executive (see User Notice 2 of the manual) except that print formatting facilities are not available.

In Application Mode the terminal system responds to specific commands sent from the mainframe as described in this User Notice.

The commands specify loading and manipulation of specified screen formats. Since screen formats are loaded locally, data sent from the mainframe is for placement in specified fields in the format and is transmitted as a series of strings. Screen characteristics such as start protected and start unprotected markers are part of the screen format data loaded from the path library and are not part of the data transmitted by the mainframe application program. The user must adhere to the legal commands and message formats permitted by Application Mode. Illegal control sequences from the mainframe will be ignored.

On initial loading, all VTs under T2C6 and T2AP01 will be in Basic Mode. One or more VTs may be switched to Application Mode by means of an ENTER AP MODE command to the relevant VTs, following which all data received for those VTs will be checked as valid commands for this mode. A further command, LEAVE AP MODE, will switch a VT back to Basic Mode and allow standard (T2C5 type) conversation to resume.

Switching between modes by operator intervention is fully described in *7503 Operating*, TP4804, User notice 5.

For T2AP01, regardless of the mode of operation of the video terminals, hard copy printers can be operated in direct output mode as for T2C5.

T2AP01 AND T2C6 BASIC MODE MESSAGE FORMAT, COMMANDS AND RESPONSES

SECTION 3

Message format presentation

Commas are used to separate discrete items in the following message format descriptions. These are not part of the messages.

The following ISO code occurs frequently in message formats and therefore its ISO mnemonic is used rather than its code:

ISO code	*ISO mnemonic*
1/11	ESC

Output message format in Basic Mode

Message formats and control sequences transmitted to the terminal for Basic Mode are as described in section 5.1.3 of the manual. However print formatting is not supported and the control sequence:

ESC,4/4,*print format program*,ESC,4/5

as described in sections 5.1.3.7 and 5.3.1.2 will have no effect and will be ignored.

There is also one extra command used during Basic Mode as described below

ENTER AP MODE command

The control sequence

ESC,4/6

causes the terminal executive to change state from Basic Mode to Application Mode for the VT addressed. The character 'F' is displayed on the last line of the screen.

Once in Application Mode both terminal executives interpret all incoming data for the video terminal as Application Mode commands and will either reply to any illegal sequences with an ERROR RESPONSE or will display the sequence on the last line of the screen.
If the ENTER AP MODE command is received by a video already in Application Mode it will be displayed, on the last line as the character 'F'.

Input message format in Basic Mode

Messages returned by the terminal system to the mainframe application program will have the format described in section 5.1.4 of the manual.

Output message format in Application Mode

Messages from the mainframe application program should consist of one or more of the Application Mode commands described below. All other data not recognised as a command sequence will be displayed on the bottom line of the screen.

The command sequence may optionally be preceded by a Set Receive control code ESC,3/1 and/or an alarm control code 0/7. These will have the usual effect as defined in section 5.1.3 of the manual.

The message format is of the form:

optional set receive code, *optional alarm code*, *system message* and/or *command sequence* and/or *system message* (alternative position)

A *command sequence* is one which starts with any valid command. Examples of typical command combinations are given after the command descriptions.

A *system message* will normally be a message from the mainframe application to the video operator and will be displayed on the bottom line of the screen. It should contain only displayable characters. Any format effectors, such as HT, will be ignored.

None of the ESC sequences given in section 5.1.3.7 of the manual, and normally used in Basic Mode, is supported except for Set Receive.

As the screen control mode character facility (described in section 5.2.2.1 of the manual) cannot be influenced from the mainframe T2C6 and T2AP01 maintain the following settings:

1 Operator movement of the SOM is always allowed. Since data insertion and extraction to/from a format are directed by the field definitions declared at the development stage to T2AP01, movement of the SOM does not affect transmissions to and from the mainframe.

  Movement of the SOM will, however, affect local output to a hard copy printer since output is from the SOM position to the character before the cursor position

2 The bottom line of the screen is always reserved for validation and other error messages from the terminal executive and system messages or invalid ESC sequences from the mainframe

3 Fields failing validation checks are not marked as failing validation and can be transmitted by SEND action. For T2AP01, any action routine linked to an input field will not have been entered and the field will therefore not have been processed

4 The special underline facility is not supported

The only screen validation sequence that has any meaning in Application Mode is IS4,4/1 which, when used in an INSERT DATA command sets a field unprotected and blank (see the description of field blanking in the section on the INSERT DATA command). Other screen validation sequences sent by the mainframe application program will be ignored.

Application Mode commands

Commands can be used to control the sequencing of formats presented on the video screen, control the positioning of the cursor and control the supply of data for insertion into the screen format.

Commands have the following structure:

control sequence, parameter string

where

control sequence identifies the command. A summary of commands and their corresponding control sequences is given below.

parameter string provides additional parameters or data for a particular command. Only certain commands require a parameter string.

The commands available in Application Mode are as follows:

Command	*Control sequence*	*Parameter string*
NEXT PATH	ESC,4/7	*a*
NEXT FORMAT	ESC,4/8	*ann*
LOAD FORMAT	ESC,4/9	
LOAD FORMAT AND WAIT	ESC,4/10	
NEXT FIELD	ESC,4/11	*ffrr* or *ffrrc* (see command description)
INSERT DATA	ESC,4/12	(see the command description)
END PATH (available in T2AP01 only)	ESC,4/13	
CONTINUE (available in T2AP01 only)	ESC,4/14	
LEAVE AP MODE	ESC,4/15	

The items in the parameter string have the following significance:

a is a path identifier in the range A to T encoded as a single ISO character (ISO codes 4/1 to 5/4)

nn is a format number within the path in the range 01 to 35 encoded as two ISO characters, each in the range 3/0 to 3/9.

For example, 4/2, 3/0, 3/8 signifies format 8 of path B.

NEXT PATH command

The control sequence

ESC,4/7,*a*

causes the terminal executive to check that path *a* exists within the User library.

General path information is loaded into store. Also, under T2AP01 only, any tables and reference file definitions for the path are loaded into store. This could result in an ERROR RESPONSE as described later.

This command is required whenever Application Mode is entered, in order to select the required path from the mainframe. Alternatively, path selection can be made by the operator if the mainframe causes the path catalogued to be displayed by sending the END PATH command (see *END PATH command*).

NEXT FORMAT command

Once a path has been entered each format has a successor as defined to T2AD01 at the development stage (see *TPL Application Programming* (Edition 1, TP4809, section 2.13.16).

The control sequence

ESC,4/8,*ann*

should be used when it is required to alter this pre-defined sequence under the control of the mainframe application program. Format *nn* of the current path *a* is noted as the next format to be entered when a subsequent LOAD FORMAT command or TPL verb LDFMT is obeyed.

In T2AP01 systems, the predefined sequence may also be changed by use of the TPL verb NXTFMT. Both the NEXT FORMAT command and the NXTFMT verb take priority over the predefined value entered on the format header at the development stage. The last NEXT FORMAT or NXTFMT issued takes precedence.

In all cases the format specified must be one from the current path otherwise an ERROR RESPONSE will be generated.

LOAD FORMAT command

The control sequence

ESC,4/9

causes the format currently defined as the next format to be loaded. The command has no parameters. If no path is currently entered for the video an ERROR RESPONSE will be generated.

The action of loading causes the screen image to be displayed and the screen field definitions and associated TPL (T2AP01 only) to be brought into store. This may result in an ERROR RESPONSE.

The cursor is positioned over the first character position of the first field on the format defined as Input on the field definition display (see *TPL Application Programming*, section 3.2.16) unless, in the case of T2AP01, an Initial Action Routine positions it elsewhere. If an initial action routine does exist it will be entered when the whole of the message containing LOAD FORMAT has been processed.

The LOAD FORMAT command has exactly the same effect as the TPL verb LDFMT.

LOAD FORMAT AND WAIT command

The control sequence

ESC,4/10

has the same actions as for the LOAD FORMAT command except that immediately after the format has been loaded a FORMAT LOADED message is returned by the terminal executive to the mainframe application program and further action is suspended until the mainframe responds. The mainframe application program should respond with an INSERT DATA command. Only when the data has been inserted into the format, and for T2AP01 when the initial action routine has been entered, is the video operator permitted to enter data.

The LOAD FORMAT AND WAIT command should be the last in a command sequence.

NEXT FIELD command

The NEXT FIELD command has two functions:

1 To position the cursor

2 To change the characteristics of a field (protected/ unprotected, steady/flashing)

Cursor positioning

The control sequence

ESC,4/11,*ffrr*

causes the cursor to be positioned at the start of field *ff* of the current format as defined in the Field Definition Table. The item *ff* is encoded as two ISO characters.

Item *rr* is used to indicate the repetition (occurrence) required when the field forms part of a repeated group (see TPL Application Programming, section 2.1.11): *rr* = 01 for the first repetition, 02 for the second and so on. If the field is not in a repeated group 01 should be used.

For example:

ESC,4/11,3/1,3/2,3/0,3/1

will position the cursor at the start of the first repetition of field 12.

A format must be loaded (by means of a LOAD FORMAT, or LOAD FORMAT AND WAIT command or LDFMT verb) before cursor positioning can be performed otherwise an ERROR RESPONSE will be generated.

No check is made to see if the field is specified as an Input field. The command may, therefore, reference any defined field on the current format. If the field or repetition does not exist an ERROR RESPONSE will be generated. A command to position the cursor should be the last in a command sequence.

Changing field characteristics

The characteristics of a field (that is, whether it is protected or unprotected, steady, flashing or blanked) may be changed by using the control sequence

ESC,4/11,*ffrr,c*

where

ffrr defines the field and repetition as for cursor positioning described above

c defines the field characteristic and is one of the following:

Field characteristic character(s)	*Effect*
DC1 (1/1)	Changes the field to protected steady
DC2 (1/2)	Changes the field to protected flashing
DC3 (1/3)	Changes the field to unprotected flashing
DC4 (1/4)	Changes the field to unprotected steady
IS4 (1/12),4/1	Changes the field to unprotected and blanked, that is, the contents of the field is maintained but not displayed

For example:

ESC,4/11,3/1,3/8,3/0,3/1,DC1

will change field 18 of the current format to protected steady.

A format must be loaded before field characteristics can be changed otherwise an ERROR RESPONSE will be generated. If the field or repetition does not exist or if IS4 is not followed by 4/1 an ERROR RESPONSE will be generated.

The command may reference any field on the current format. Several NEXT FIELD commands of this type may be present in a command sequence. The data contents of a field are not altered by changing its characteristics.

INSERT DATA command

The INSERT DATA command is used to place additional data into fields on the screen. The command may be used in the following circumstances:

1 Following a LOAD FORMAT command in a command sequence the command may be used to insert data into the format either before the video operator is permitted to enter data or, in the case of T2AP01, before an Initial Action Routine is entered.

2 Following a FORMAT LOADED response to a LOAD FORMAT AND WAIT command, otherwise the action is as above.

3 During data entry by the video operator the TPL verb SEND may return data to the mainframe application program which responds by using the INSERT DATA command. The transmitted data is inserted into the format. This applies to T2AP01 only. In this context see also the CONTINUE command.

The INSERT DATA command has the following format:

ESC,4/12,*ann*,IS1,*text*,IS1,*text*,...,IS1,*text*,IS1

where

IS1 is the ISO information separator code 1/15

ann identifies the path and format as defined earlier

text is the data for insertion in the format

An ERROR RESPONSE will be generated if the format has not been loaded.

Each ISl nominates a field specified as an *Insert* field on the field definitions display (see *TPL Application Programming*, section 3.2.16), for example, ISl, ISl,*text* refers to the second *Insert* field. Within repeated groups all fields must be stepped through before advancing to a field beyond.

If ISl is followed by a text string, the text string will be placed in the indicated field. If ISl is followed by a space character only then the field will be space filled. If ISl is followed by ISl with no intervening character then the field will be skipped and will be unchanged.

The text string should consist of displayable characters (ISO codes 2/0 to 7/15) and certain allowed control characters as described below. The text is inserted into the field left justified although, of course, any number of leading character positions could be space filled so as to position the displayed text in the middle of the field, for example. Fields into which data is inserted cannot exceed 80 characters in length and must not overlap a screen line.

If the text string exceeds the length of the field the data will be truncated at the right-hand end. If the text string is shorter than the specified field then the field will be space filled to the righthand end.

An ERROR RESPONSE will be generated if an ISl is followed by text when there are no further *Insert* fields left to receive data.

Within the *text* part of the command control sequences may be used to achieve the following:

1 HORIZONTAL TABULATION The control sequence:

HT, *q* (where HT is the ISO code 0/9)

may be used to achieve horizontal tabulation within the screen field. The qualifier character *q* is a code in the ranges 4/1 to 5/15 or 2/0 to 3/15. Codes 4/1 to 5/15 correspond respectively to tabulations of 1 to 31 positions, codes 2/0 to 3/15 correspond to tabulations of 32 to 63 positions. Tabulations are skips relative to the current character position in the current field. All characters skipped remain unchanged.

If an HT sequence goes beyond the end of the field all subsequent data for that field is ignored.

2 CHANGING FIELD CHARACTERISTICS Any of the field characteristics characters defined for the NEXT FIELD command may be used at any point in a text string. However, in an INSERT DATA command the characteristics only apply to the text inserted and not to characters skipped or not replaced.

An example will best illustrate the special use of the above control sequences. Consider the following INSERT DATA command (commas are used in the example to separate each ISO character and would not be present in the actual message):

```
                     field 1 field 2      field 3
ESC,4/12  ann,   IS1,    IS1,2/0, IS1,HT,4/2,www,
                     field 4
IS1,DC3,HT,4/3,xxx,HT,4/2,yyy,HT,4/4
  field 5              field 6
IS1,zzz,DC2,IS1,IS4,4/1,2/0,2/0,2/0,2/0,IS1
```

where

ann is format *nn* of path *a*.

w, x, y and *z* are any displayable ISO codes in the range 2/0 to 7/15.

Field 1, field 2, etc. refer to display fields defined as Insert fields on the field definition display (see *TPL Application Programming,* section 3.2.16).

The following actions would result from the above example:

Field 1: the field is skipped. The contents remain unchanged.

Field 2: the field is space filled

Field 3: the first two characters of the field remain unchanged; the ISO codes for *w, w, w* are inserted in character positions 3, 4 and 5; the remainder of the field is space filled.

Field 4 (a 15 character field): the first three characters are skipped; the ISO codes for *x, x, x* are inserted in character positions 4, 5 and 6; character positions 7 and 8 are skipped; the ISO codes for *y, y, y* are inserted in character positions 9, 10 and 11; character positions 12, 13, 14 and 15 are skipped; the inserted characters *x, x, x* and *y, y, y* are made unprotected flashing leaving the other nine characters unchanged.

Field 5 (a 3 character field): the three characters *z,z,z* are inserted and the field made protected and flashing.

Field 6 (a 4 character field): the current contents of the field are replaced by spaces and the field characteristics changed to unprotected and blanked. Subsequent input to this field by an operator will not be displayed.

The input field delimiters (⌊ and ⌋ respectively) associated with the currently displayed format are not affected by the use of field characteristic characters in an INSERT DATA command.

END PATH command

The control sequence

ESC,4/13

terminates the current path and causes the path catalogue to be displayed. The video remains in Application Mode.

Since the path catalogue is a TPL facility this command is available in T2AP01 only. The path catalogue displays the currently available paths in the users system. The command thus allows the video operator at the terminal to select a further path. The path selected by the operator will be indicated to the mainframe application program by the contents of the first screen data message returned by the terminal systems to the mainframe since the path identifier is returned with each message.

In T2C6, the mainframe application program must control all path selection as there is no path catalogue provided.

CONTINUE command

This command is available in the T2AP01 terminal executive only.

As mentioned earlier the TPL SEND verb may be used to return results to the mainframe application program before data entry or processing of the current screen format is complete. If, in addition, the MFWT boolean has been set ON in the same Action Routine (see *TPL Application Programming*, Publications notice 3) then the Terminal Executive will wait before allowing any further TPL statements to be obeyed. In this waiting period the mainframe application program may respond with further data for insertion in the format by means of the INSERT DATA command.

The CONTINUE command control sequence

ESC,4/14

is used to restart the Action Routine at the next TPL statement following the SEND verb. No other command may follow the CONTINUE command in the same command sequence.

If there is no data for insertion the mainframe application program may respond with a CONTINUE command alone.

If the command sequence in response to a SEND verb does not include a CONTINUE, and SET RECEIVE is not present, the video will enter TYPE mode and the Action Routine will be aborted. This is useful if the response indicates an error in the data sent and enables the operator to correct the data and re-send.

An ERROR RESPONSE will be generated if CONTINUE is received when not expected.

LEAVE AP MODE command

The control sequence

ESC,4/15

is used to exit from Application Mode and enter Basic Mode. Any TPL currently running is terminated and the screen is cleared. No other command may follow the LEAVE AP MODE command in the same command sequence and any further data in the message is ignored.

Any Application Mode control sequence received when the terminal executive is in Basic Mode will have the escape character removed and the following character (or character sequence) will be displayed on the bottom line of the video screen.

Input message format in Application Mode

Three types of messages may be sent to the mainframe:

1 CONTROL MESSAGES These are replies from the terminal system to commands received from the mainframe. For example, when the terminal system receives a LOAD FORMAT AND WAIT command, it responds to the mainframe indicating that the format has been loaded with a FORMAT LOADED message

2 DATA MESSAGES in the form of screen data

3 ACTION MESSAGES These are generated by action keys that have no associated TPL Action Routine

The messages have the following format:

1 IS4, *PID identifier*,IS4,*control sequence*,*parameter*

2 IS4,*PID identifier*,IS4,IS2,*data string*,IS2

3 IS4,*PID identifier*,IS4,ESC,*a*

where

IS2 is the IS0 information separator code 1/14
IS4 is the IS0 information separator code 1/12

PID identifier is a two IS0 character field encoded in the form 4/*s*,4/*t* identifying the PID value present in the reader of the video from which the message originated.

st together form an 8-bit binary value in the range 0 to 250.

The whole sequence IS4,*PID identifier*,IS4 is omitted if a PID is not present in the reader or if the video has no PID reader.

control sequence parameter is the terminal response as described below in the section *Control messages*.

data string is a screen data message as described later, in the section *Data messages*.

a is generated by the use of an action key as described later in the section *Action messages*.

CONTROL MESSAGES

The possible control sequences are:

Message	*Control sequence*	*Parameter*
ERROR RESPONSE	ESC,5/13	*e*
FORMAT LOADED	ESC,5/14	

ERROR RESPONSE message

The sequence

ESC,5/13,*e*

is sent to the mainframe for a variety of error conditions as given below.

e is one of the following error qualifiers:

Qualifier	*IS0 code*	*Meaning*
0	3/0	Path number not in range A to T
1	3/1	Diskette failure
2	3/2	This path not in catalogue
3	3/3	No format on screen (for example INSERT DATA or NEXT FIELD command too early)
4	3/4	NEXT FORMAT command specifies a path other than the current path
5	3/5	Format number invalid (not in range 00 to 99)
6	3/6	Not used
7	3/7	CONTINUE command received but not expected
8	3/8	Not used
9	3/9	No current field. That is, INSERT DATA command with too many fields for screen

Qualifier	*IS0 code*	*Meaning*
A	4/1	Failure to load path header
B	4/2	Failure to load table information
C	4/3	Failure to load reference file information
D	4/4	Failure to load format header
E	4/5	Failure to load TPL object code
F	4/6	Failure to load screen definitions
G	4/7	Failure to load screen image
H	4/8	Failure to open or close reference files
X	5/9	Invalid field number in NEXT FIELD command
Y	5/10	Invalid repetition in NEXT FIELD command
Z	5/11	IS4 not followed by 4/1 in a NEXT FIELD or INSERT DATA command when chaning field characteristics to unprotected blanked

Note that A to H inclusive relate to errors during the loading of TPL elements and are caused mainly due to diskette read failures, oversize application, or the fact that an element of the path or format was not defined at development time.

Following transmission of an error response the VT will be left in receive mode awaiting mainframe action.

Only the video operator involved with the error is affected. All other video operators can continue to work normally.

FORMAT LOADED message

After a LOAD FORMAT AND WAIT command the response:

ESC,5/14

is transmitted to the mainframe to indicate that the specified format has been found and successfully loaded. The mainframe application program may then issue an INSERT DATA command.

If a LOAD FORMAT command is used this response will not be generated.

DATA MESSAGES

Screen data messages are transmitted to the mainframe by:

1 Depression of the SEND key by the operator (T2C6 always, T2AP01 if no SEND Action Routine is defined)

2 Action of the TPL SEND verb in the case of T2AP01

The format of the *data string* in a data message is as follows:

ann,IS1,*text*,IS1 *text*,...,IS1,*text*,IS1

where

IS1 is the IS0 information separator code 1/15

ann is format *nn* of path *a*, as described earlier

text is the text from a field on the video screen

Each *text*,IS1 sequence relates to a field on the T2AD01 field definition display defined as *Transmit* (see *TPL Application Programming*, section 3.2.16).

Applications mode diagrams

Pressing CTRL together with an alphanumeric key is called an Action Key depression. The result is as follows:

1 T2AP01. At the development stage Action Keys may be associated with action routines. The use of an Action Key defined in this way causes entry to the associated action routine (see *TPL Application Programming*, section 2.1.10 for further details).

When an Action Key that has no associated action routine is pressed an *action message* is sent to the mainframe

2 T2C6. Use of an Action Key always causes an *action message* to be sent to the mainframe

The format of the *action message* is

ESC,*a*

where *a* is the ISO code of the key pressed with CTRL.

Note: Avoid using the] key and ^ key for action messages as these use the same codes as the error response and FORMAT LOADED messages and confusion could result.

A conceptual diagram showing how the terminal executives process incoming messages is given in Figure 1. The use of flags in the diagram relates to the internal operation of the terminal executive and does not specify any required action from the operator or customer program

Figure 2 shows how the terminal works from another viewpoint. The illustration demonstrates how the terminal automatically changes between type mode, send mode, TPL mode (in the case of T2AP01) and receive mode according to the occurrence of certain events such as an operator pressing the SEND key or the reception of a particular command. This ensures that the terminal is in the correct functional mode according to whether typing, sending, executing TPL or receiving is required next. (Note that the functional modes referred to in this paragraph bear no direct relationship to the terms *Application mode* and *Basic mode*.

Valid command combinations in Application Mode

There are few restrictions governing command combinations and they are fairly obvious, that is, LOAD FORMAT AND WAIT, NEXT FIELD (to position the cursor) and CONTINUE commands should be the last in a command sequence.

All other commands should be sequenced in chronological order to prevent the generation of an ERROR RESPONSE or the nullifying of an earlier command; for example, INSERT DATA, LOAD FORMAT would not be a sensible sequence.

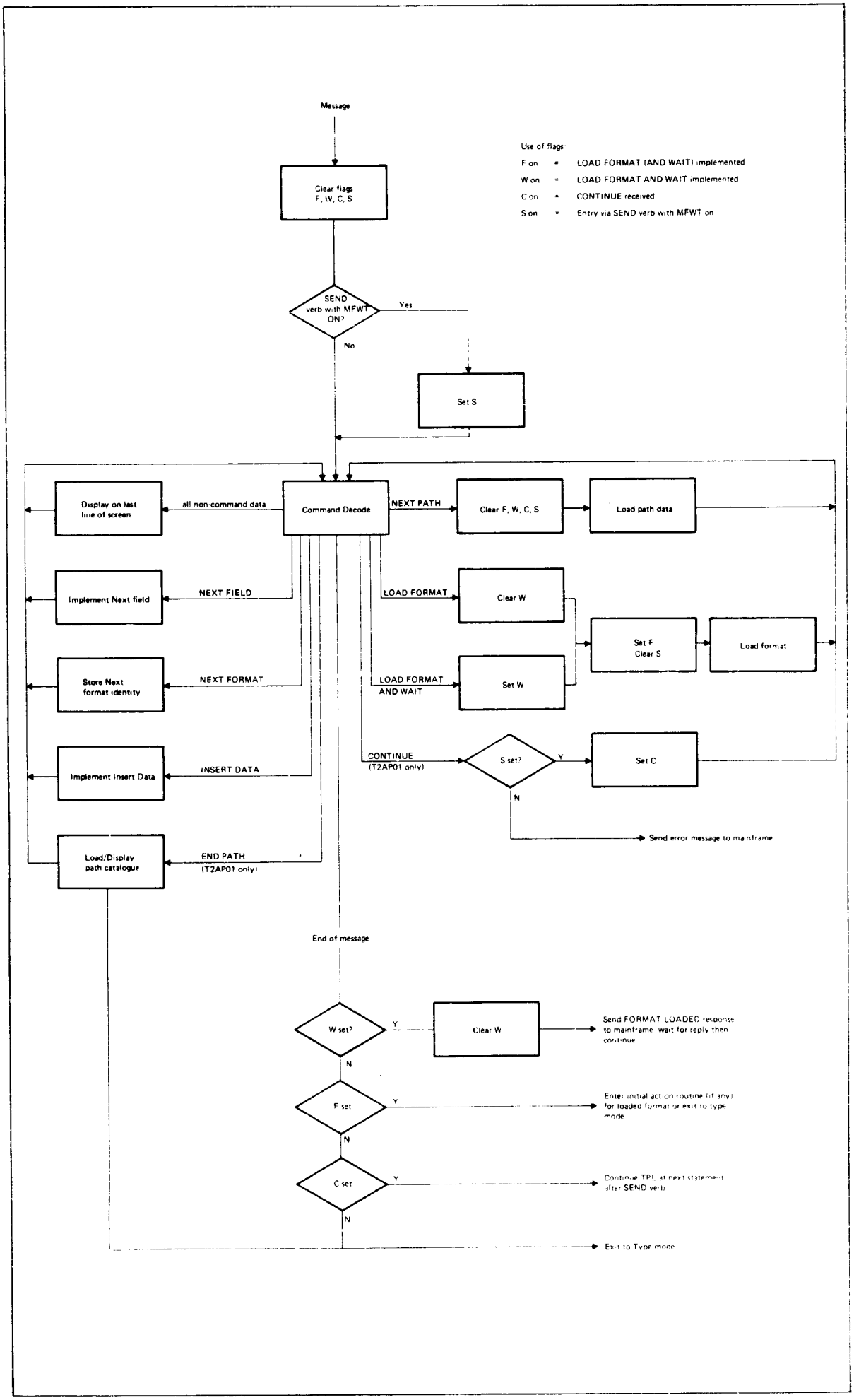

Figure 1 T2AP01/T2C6 Command Processing in application mode

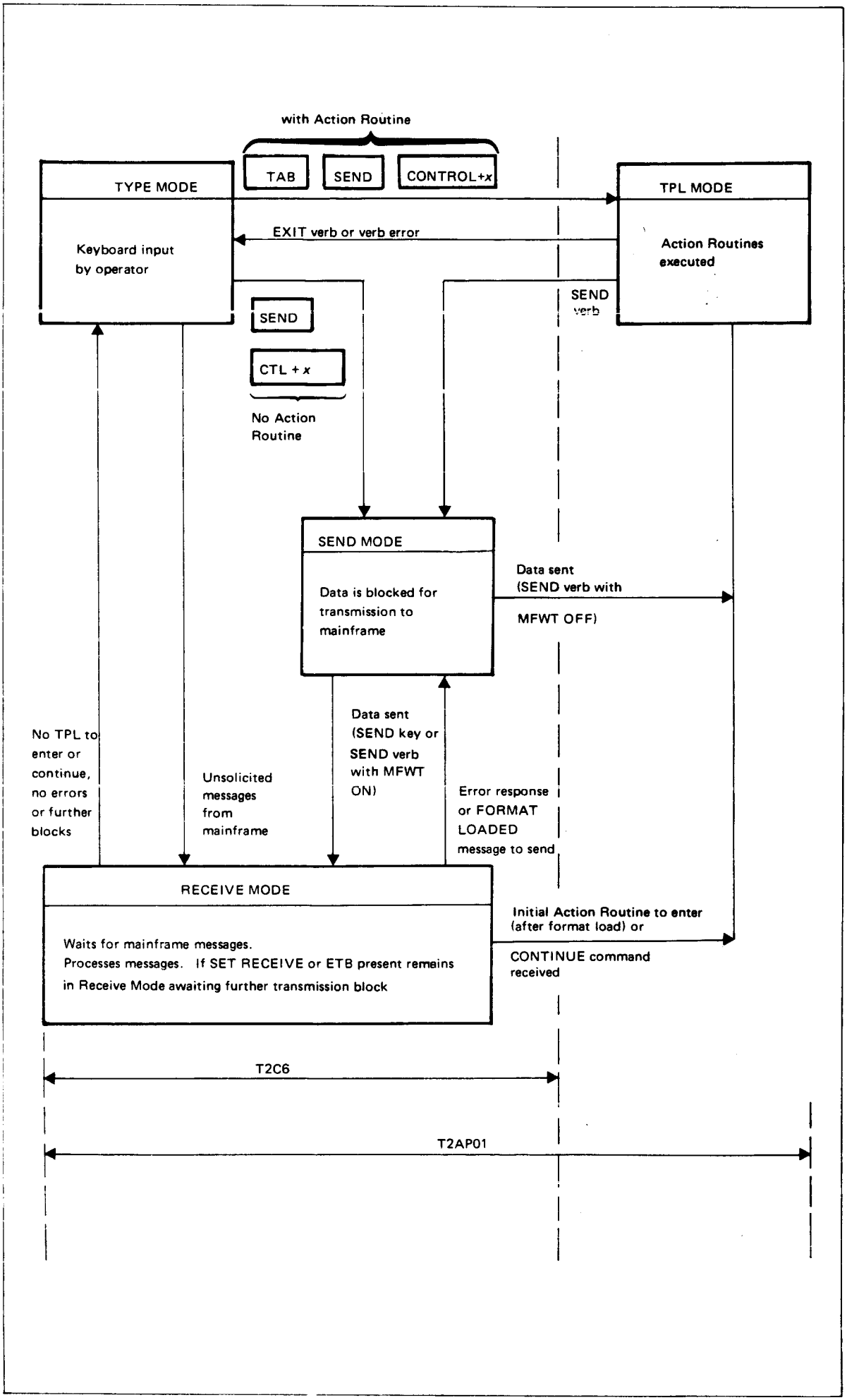

Figure 2 T2AP01/T2C6 Transition diagram for application mode

Examples of the use of some message sequences

The following examples illustrate some typical command sequences used by mainframe application programs. The commas are not required in the actual transmissions.

1 ENTER AP MODE,NEXT PATH *a*,LOAD FORMAT

The reply to a request in Basic Mode from an operator to start Application Mode with path *a*. The first format is loaded and entered

2 (i) SET RECEIVE,ENTER AP MODE
(ii) END PATH

Start of day procedure where only Application Mode is used in a system using T2AP01. The Path Catalogue is displayed. SET RECEIVE is used to force the message in case the video is not already in Receive Mode. As this causes the video to stay in Receive Mode the sequence is split into two messages to put the video into Type Mode

3 (i) SET RECEIVE,ENTER AP MODE
(ii) NEXT PATH *a*,LOAD FORMAT

An alternative start of day procedure particularly for T2C6 which does not support the END PATH command. This sequence is also useful where the mainframe application has got out of step and wants to restart. ENTER AP MODE is ignored if the video is already in Application Mode

4 System message, NEXT FIELD *ffrrc*,NEXT FIELD *ffrrc*,.....,NEXT FIELD *ffrr*

The mainframe application has detected errors in several fields of the screen just sent by the operator. It displays a message to the operator on the last line of the screen, causes the fields in error to flash and sets the cursor to the start of the first of them

5 NEXT FORMAT *ann*,LOAD FORMAT,INSERT DATA *ann* IS1 *text* IS1 *text*.....IS1

Useful where the mainframe application wants to override the usual successor format and is carrying over data such as customer account number and accumulated totals from the previous screen. The specified format is loaded, the data is displayed in Insert fields and the format is entered

6 (i) NEXT FORMAT *ann*,LOAD FORMAT AND WAIT
(ii) FORMAT LOADED (from terminal)
(iii) INSERT DATA *ann* IS1 *text* IS1 *text*.....IS1

An alternative to the previous example. The video returns to Type Mode only at the end of the sequence

7 INSERT DATA *ann* IS1 *text* IS1 *text*.....IS1,CONTINUE

An Action Routine has previously sent part of a screen to the mainframe application which is now responding with data for display and a command to resume processing at the next TPL verb after the SEND verb. This is useful where it is necessary to access a mainframe file for information, for example, customer name and address in response to account number, before proceeding with the rest of the screen

8 System Message, CONTINUE

An alternative to the previous example where mainframe validation only is required. The response is a confirmation

on the last line of the screen and a resumption of processing

9 (i) INSERT DATA *ann* IS1 *text* IS1 *text*.....IS1,CONTINUE
(ii) SEND (from terminal)
(iii) NEXT FORMAT *ann*,LOAD FORMAT

The mainframe application responds to a completed screen transmission with data for inclusion on the screen and output to hard copy printer. The CONTINUE allows the suspended SEND Action Routine to resume and perform PRINT verbs. Following the PRINT verbs a final SEND verb with a single field advises the mainframe application that printing is complete and the next mainframe selected format may now be loaded and entered. If the normal successor format always follows, the final SEND would be replaced by a LDFMT verb and (ii) and (iii) would be omitted

10 NEXT FORMAT *ann*,LOAD FORMAT,System Message

The mainframe application has selected a format with maybe several functions. The System Message directs the operator as required. Note that it must follow LOAD FORMAT or it will be erased by the LOAD FORMAT action

Basic dialogue

Figures 3, 4 and 5 give examples of typical basic dialogues that can occur between the mainframe and the terminal. They are not intended to be exhaustive or cover all possibilities. The diagrams should be studied in conjunction with the examples of the message sequences given in the previous section and it will be found especially useful to refer back to the transition diagram in Figure 2 when working though Figure 5.

FILE TRANSMISSION SECTION 5

The following information is additional to that given in User Notice 3, section 3 and is applicable to users writing their own mainframe application programs to handle file transmission to and from diskettes on a 7502 terminal system.

File headers and trailers for Application Programming files

Diskette files transmitted from the terminal system to the mainframe have the file header and trailer formats defined below. Users should ensure that files transmitted to the 7502 terminal for storage on diskette (for example, Application Programming reference files) adhere to the same format.

FILE HEADER

Character positions	*Field*	*Contents*
0	Identifier/ Delimiter	IS4 (IS0 information separator code 1/12)
1 to 3	Type	Three alphabetic characters as follows:

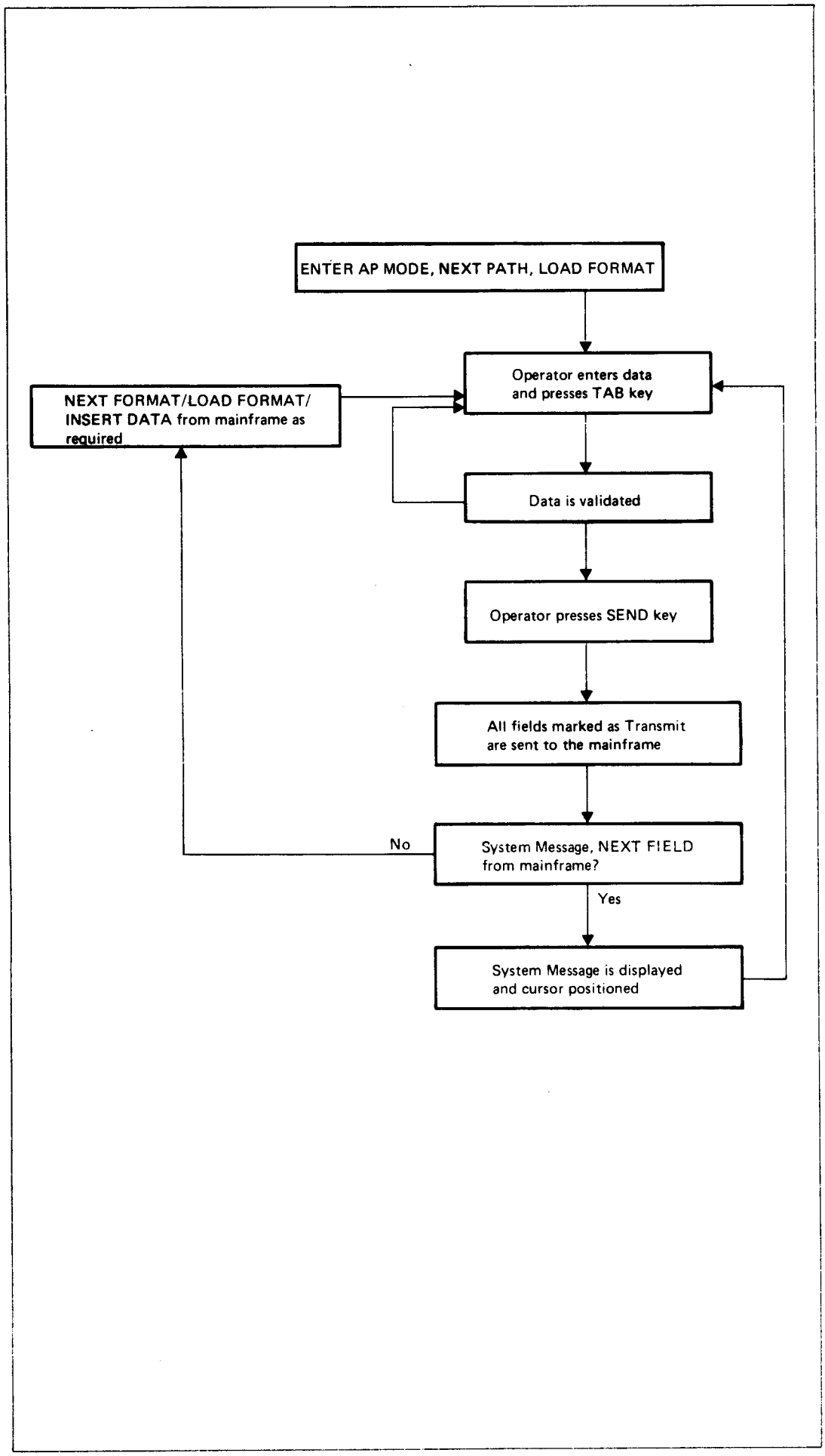

Figure 3 Basic dialogue between mainframe application program and T2C6

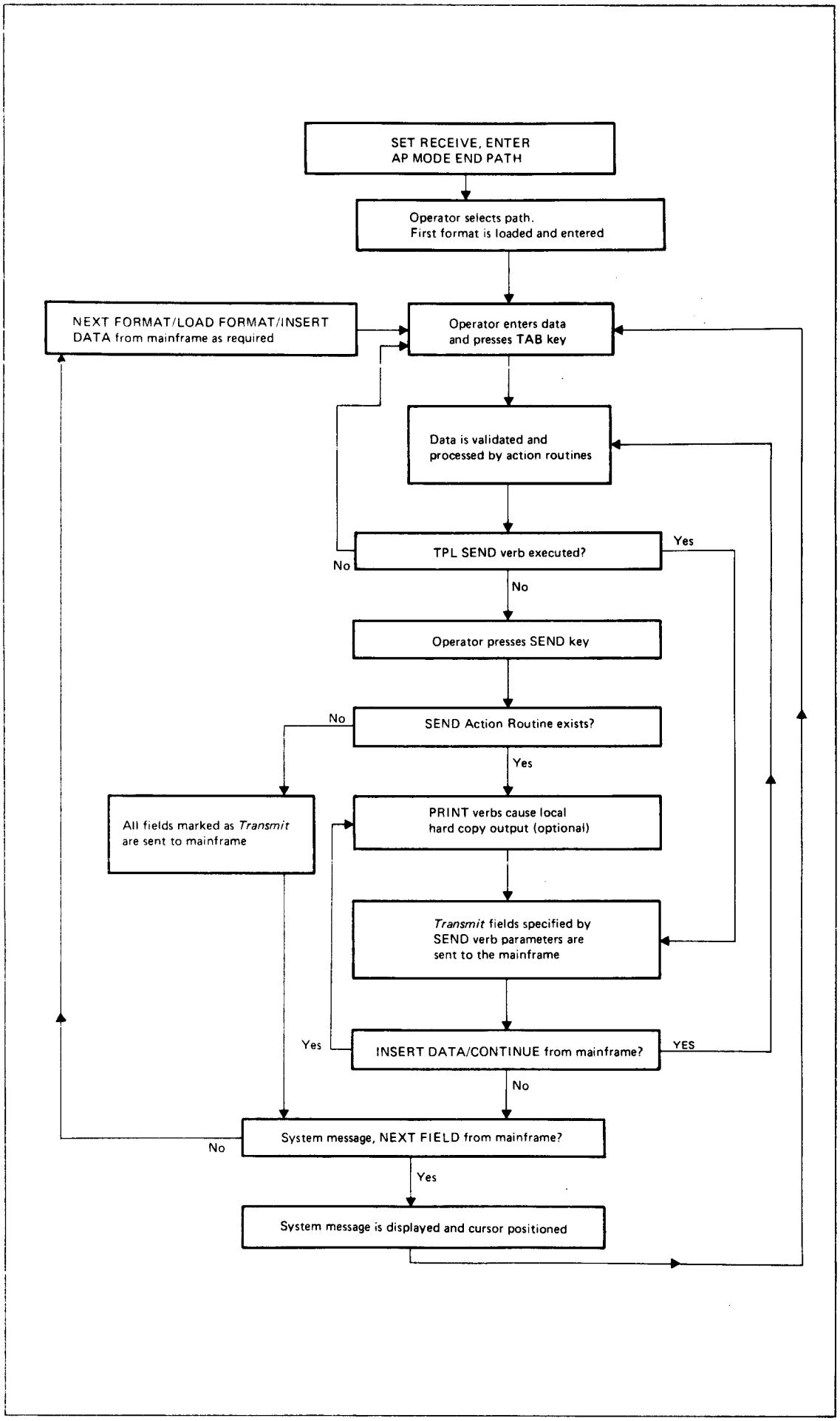

Figure 4 Basic dialogue between mainframe application program and T2 AP01

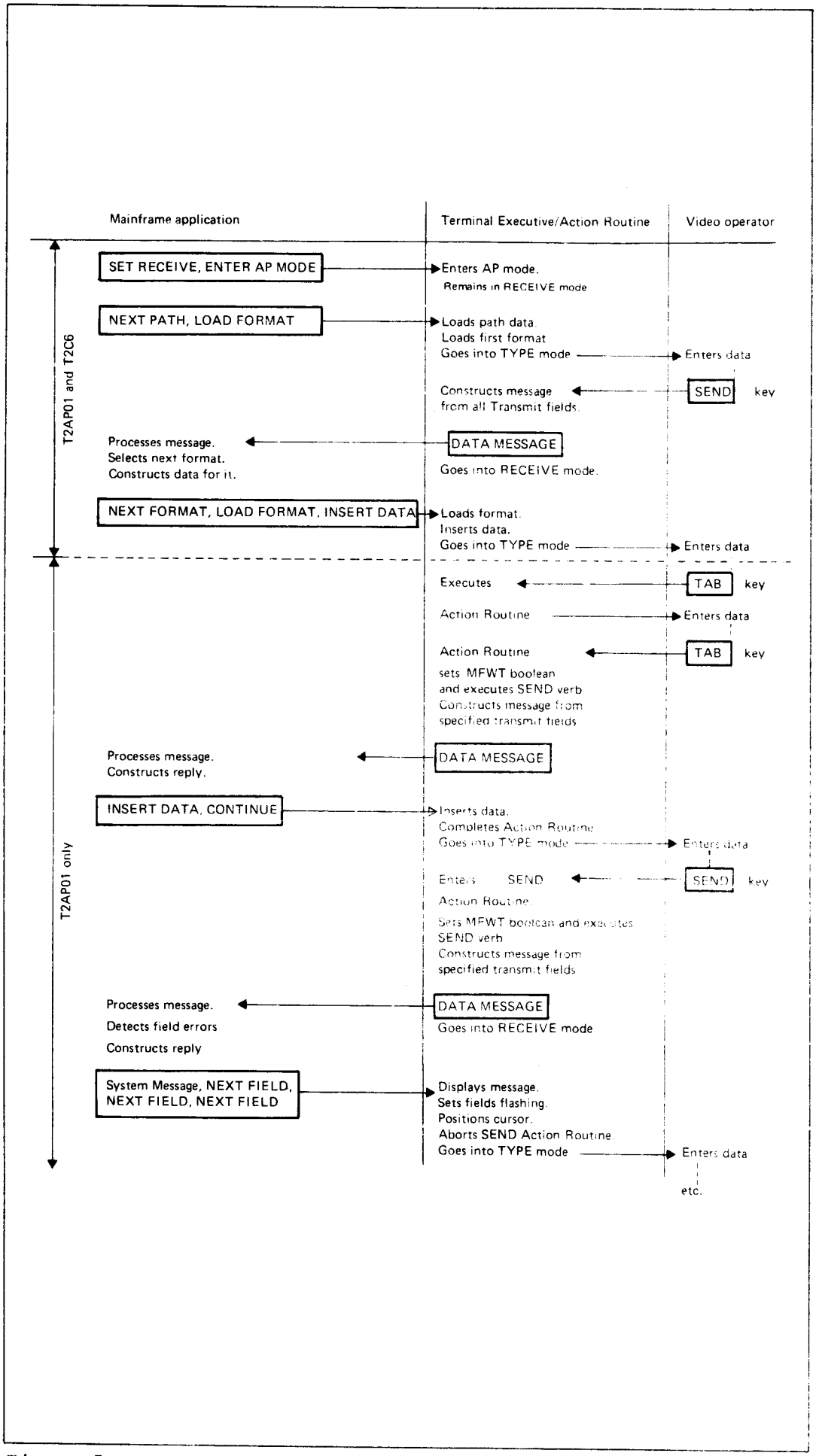

Figure 5 Examples of typical dialogue sequences for T2AP01 and T2C6

Character positions	*Field*	*Contents*	
		Characters	*Meaning*
		REF	Application Programming reference file
		LIB	Path library file
		SOP	Application Programming screen output file (that is, a spool file containing data keyed in by the operator)
4 to 6	Organisation	Three alphabetic characters as follows:	
		Characters	*Meaning*
		IND	Indexed sequential file (for reference files)
		Space filled (ISO 2/0 codes)	Used if the type is SOP (see above)
		TRE	Tree structured file (for path library files)
7 to 8	Structure	Two alphabetic characters as follows	
		Characters	*Meaning*
		VU	Variable length records, unblocked (reference files)
		VB	Variable length records, blocked (spool files)
		FU	Fixed length records, unblocked (path library files)
9 to 13	Record size	Reference files 128 Spool files 2000 Path library files 128	
14 to 15	Volume number	Two numeric characters giving the volume number within the file of this volume. Currently always 01	
16 to 31	Name	16 alphanumeric characters (left justified and space filled to the right) specifying the file name as follows: For T2AS4: name of file to receive data (only the first eight characters are used) For T2AS5: name of file from which data is being sent (up to eight characters)	
32 to 35	Reserved	Four spaces	

Character position	*Field*	*Contents*
36 to 47	Originator	Twelve alphanumeric characters specifying the origin of the file as follows: T2AS4: at users discretion (ignored by the TE) T2AS5: spaces only
48 to 53	Creation date	Six numeric characters in the form *ddmmyy*. These are held on the file index on diskette as follows: T2AS4: the data is stored on the index T2AS5: the data is copied from the index to this field
54 to 59	Date last updated	Six numeric characters in the form *ddmmyy* T2AS4: ignored by the TE T2AS5: spaces only
60 to 65	Expiry date	Six numeric characters in the form *ddmmyy*
66	Terminator	IS3 (ISO information separator code 1/13)

FILE TRAILER

The layout of the trailer is as follows:

Character position	*Field*	*Contents*
0	Identifier/ delimiter	IS3 (ISO information separator code 1/13)
1 to 3	Type	As in characters 1 to 3 of the header
4 to 6	Organisation	As in characters 4 to 6 of the header
7 to 8	Volume number	As in characters 14 to 15 of the header
9 to 24	Name	As in characters 16 to 31 of the header
25	Terminator	DC2 (ISO code 1/2)

LINE PRINTER DATA — SECTION 6

The following information is additional to that given in User Notice 3, section 4 under *Line printer data*.

Device control characters

The device control characters described below may be included in data sent to a line printer.

Character	*Code*	*Function*
DC1	1/1	Causes the printer to be freed and made inoperable. The printer will be available for further use after re-allocation by the terminal operator
DC2	1/2	Causes the printer to be freed but not made inoperable
DC3	1/3	If a paper low condition has occurred or the HOLD switch has been depressed, DC3 causes the printer to be made inoperable. The printer is made operable after the operator has replenished the paper supply and/or re-allocated the printer. No action results if a paper low or HOLD condition has not occurred
DC4	1/4	Causes the printer to be made inoperable

Notes

1 DC1 or DC2 should be the final character in the last message of a file sent to the terminal to indicate that the end of the print file has been reached.

If action by the terminal operator is necessary before a further file can be transmitted (for example, if the type of stationery needs to be changed) then DC1 should be used, otherwise DC2 will suffice

2 If the file being printed is organised into pages it is recommended that a DC3 character is included in the last line of each page to cater for a possible PAPER LOW or HOLD condition. When PAPER LOW or HOLD does occur, it will thus be catered for automatically.

THE T2UxI TERMINAL EXECUTIVES — SECTION 7

The T2UxI series of terminal executives provide the ISO diskette utilities used in conjunction with the applications programming-related terminal executives, namely, T2AP01, T2AP11, T2AS4 and T2AS5. The T2UxI series is not compatible with the existing T2Ux utilities, which are used in conjunction with earlier terminal executives.

Full details on the facilities and use of the T2UxI series are given in *7502 Operating* (Edition 1, TP4804), User notice 3.

Page 3, Interactive and remote printing terminal executive

Line 6 should read

"... by insertion of a console PID ..."

Page 6, T2IP01 Facilities

The second paragraph should read:

"The interactive facilities supported are as described in Chapter 5 of the manual, except for screen validation and hard copy formatting which are *not* provided by T2IP01."

Page 7, Spool file format

In the format, after "*record identifier*" add <ISl>. On page 8, in the description of the data field format delete the initial ISl. (The effect of this change will be observed only when a spool file record has no *data* portion.)

International Computers Limited

User notice

PUBLICATION (NOTICE NO.)

4802

7500 SYSTEM (5)

3/8/78

File one copy of this notice with each of the publications indicated

CONTENTS

THE 7525 LINE PRINTER

7503 MTP3 systems may be specified with a new Line Printer - the 7525/03 - as an alternative to the current 7527 mechanism for Bulk systems.

The 7525/03 operates at a speed of up to 300 lpm. The mechanism is identical to that of the 7525/02 (for 7502 systems) described in Publication Notice 3 to the ICL publication *7500 System*.

Connection of the 7525/03 to the 7503 Terminal is via the existing Line Printer Coupler F1766/00. Note however that the 7525/03 is only offered with 7503 systems using the 7591/02 Console Desk Type 2.

The 7525/03 may only be used with the English Standard Character Repertoire.

The operating of the 7525/03 Line Printer is described in Publication Notice 4 to the ICL publication *7503 Operating*.

F1700 PRINT BARREL OPTION ON 7527 PRINTERS FOR TCP T3D1

7527 printers using the F1700 (1900 Series) print barrel can now be used by T3D1. Use of the F1700 barrel connected to 2900 systems necessitates the character substitutions # for \, ↑ for ^, ← for _ and ? for ¦.

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AMENDMENTS TO THE 7503 EQUIPMENT LIST

The following information should be added to the 7503 equipment list:

7525/03	Line printer 132 print positions, up to 300 lines per minute
F2055/00	English print barrel, Standard Character Repertoire
F2058/00	Special print barrel with 1 non-standard character and/or any re-arrangement of standard 64 character set
F2059/00	Additional Non-Standard Character
F2060/00	Spare Special print barrel (required when F2058 is specified)

Publications notice

Technical Publication no.	Title (Notice no.)	Date
4802	*7500 System (6)*	17/8/78

CONTENTS

PROGRAM T3C30

This TCP has been added to the T3C3 group of TCPs. It provides a bulk system for online working to a mainframe, and supports a line printer, card reader and/or paper tape reader, and a 7506/01 or 7507/01 console device.

The store required is 24Kb.

SUPPORT INFORMATION FOR T3Cx SYSTEMS ON 7503

7503 terminal addressing under XBM procedures

The address of a device under XBM procedures is in two parts consisting of two ISO characters as follows:

1 The base address of the terminal and

2 The address of the device itself

Thus two devices attached to different terminal systems on the same line may both have the same device address. This addressing system is exploited by assigning fixed addresses to individual devices (see below). Multidrop configurations are catered for by assigning different base addresses to each terminal on the line.

The following base addresses may be used as 7503 terminal addresses

2/0, 2/4, 2/8, 2/C, 3/0 ... up to 7/C

The address to which an individual 7503 responds must be specified when the TCP is ordered.

Devices possess an address by which they are known to the mainframe. These addresses are relevant to mainframe literature describing system configuration.

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Device	*Mnemonic*	*Tributary address*
Paper tape reader	TR01	6/2
Card reader	CR01	6/1
Line printer	LP01	6/0
Hard Copy Printers	TM01, TM02,....	5/0, 5/1,....
Video terminals	VT01, VT02,....	3/0, 3/1,....
Console device		2/2

Interactive systems Personal Identification Device (PID)

Under T3C*x* TCPs, PID data is included in messages from interactive videos only if a PID device is present in the PID reader. Under other circumstances (that is, no PID device in the reader or no PID reader fitted to the VT) the complete PID field, including the <IS4> delimiters, is omitted from the message.

The PID data transmitted to the mainframe by T3C*x* TCPs is encoded as two ISO characters:

4/*s* 4/*t*

where *st* together form an 8 bit binary value in the range 0 to 255, with *s* as the most significant four bits. Thus 19 would be encoded as 4/1 4/3.

7500 7500

Publications notice

ICL

Technical Publication no.	Title (Notice no.)	Date
4802	7500 SYSTEM (7)	22/11/78

T2AP12 RELEASE 200

This Publications Notice summarises the facilities provided in a new terminal executive T2AP12.

T2AP12 provides all the facilities of T2AP11 for the running of off-line video spooling applications but in addition supports an enhanced Terminal Programming Language (TPL). Using the TPL enhancements the user is able to develop two major new facilities for manipulating, amending and verifying batches of video records. The facilities are termed *search and modify* and *second-key verification.*

The search and modify facility enables individual records to be searched for and retrieved from a batch of spooled records and then displayed on the screen in the transmit fields of a screen format. This will normally be the originating format but the user has complete control to use an alternative if desired. After the displayed record has been *modified* it can be written back to the video's subfile in place of the original record.

The second-key verification facility allows a complete batch of records to be transferred one by one via the video screen from one subfile to another subfile. When an individual record is displayed the fields that have been identified as requiring verification are blanked by T2AP12. The operator then re-types the blanked fields and the data is compared with the original data character by character. Where differences occur the operator is notified and can ensure that the correct version is written to the new subfile.

With either search and modify or second-key verification a particular record can be *deleted* or a new record can be *inserted* as required into any position in the subfile.

Additionally T2AP12 allows the amending of reference file records. The file is defined at development time as liable for amendment and may subsequently be opened for read or write access by one or more paths at a time. Records read for write access will be locked by T2AP12 against other write access users until written back.

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T2AP12 also provides enhanced program testing facilities allowing a single-shot mode so that TPL can be run one statement at a time and a facility is provided to display the contents of registers and booleans from one video onto the screen of another so that the progress of an application can be monitored.

T2AP12 is fully compatible with T2AP11 enabling users to run existing applications. However, T2AP12 cannot be used for development which must be done under T2AP11 in conjunction with the development system T2AD01 in the manner described in the manual.

T2AP12 supports up to four 7561 videos, optionally with PID readers, up to two hard copy printers (HCP-45, HCP-60 or HCP-180) and one or two Dual Floppy Disc Drives. In order to provide the new facilities T2AP12 requires 40K bytes of store

Operating instructions for T2AP12 are given in Publications Notice 8 to *7502 Operating* (TP4804) and a comprehensive description of the new facilities and the enhancements to TPL is given in Publications Notice 5 to *TPL Application Programming* (TP4809).

Publications notice

Technical Publication no.	Title (Notice no.)	Date
4802	*7500 System (8)*	3/1/79

THE 7502 MODEL 10 AND MODEL 15 SYSTEMS

This Publications notice replaces the first issue of Notice 2. The first issue of Notice 2 is withdrawn and should not be used. A second issue of Notice 2 is a single page entry to be inserted in the manual in place of the first issue. The second issue refers the reader to this publication.

The purpose of this Publications notice is to update and supplement the information in Notice 2 issue 1. This notice describes the interactive and simple stand-alone facilities provided on all models of 7502. The notice brings together information on 7502 configurations, outlines the total facilities, provides equipment lists, for each model and summarises the terminal executives and gives the current information on mainframe support available. The notice does not describe remote printing, remote batch work and Application Programming facilities. These are mentioned for the sake of completeness in configurations and tables but for full details users are referred to other Publications notices.

Operating information for the 7502 Model 10 and 7502 Model 15 is provided in conjunction with Publications notices to the following publications:

7502 Operating (Edition 1, TP4804)
Operating 7500 Range Video Terminals (Edition 1, TP4803)

CONTENTS

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Hardware aspects

Model 15 Interactive Stand-Alone Terminal Systems may be configured with up to six 7561 Video Terminals (VTs) with 2000 character displays or eight 7561 VTs with 960 character displays. No mix of 960 and 2000 character displays is permissible on one system. A dual floppy disc drive is fitted as mandatory.

The hardware for the Model 15 comprises:

Basic	*Optional*
7502/05 Modular Terminal Processor (MTP) with 16 Kbytes of store	Store increases to 28 Kbytes or 40 Kbytes
7561/01 or 7561/02 VT with PID reader and pack of console PIDs	Extra VTs as shown in Table 3 and various PIDs
7551/12 dual floppy disc drive (including coupler and housing unit)	7551/16 second dual floppy disc drive (including housing unit)
Terminal cascade facility	
	Up to four 7572, 7574 or 7576 hard copy printers (HCPs) of any mix.
	One line printer (7525/02, 7520/11 or 7521/11)

Appendix 1 contains an equipment list for the Model 15 systems.

Operational use of the hardware

References are made to other publications in cases where the facilities listed below are not described in this Publications notice. Figure 1 illustrates the hardware enhancement paths applicable to the Model 15 terminal systems.

1 The 7502/05 MTP has a 16 position rotary switch mounted on the front panel which allows operator selection of loading and dumping routines. A set of four status lamps indicates the success or fault status after particular operations

2 In the basic system the 7561 VT is used in console mode to control the terminal system. Additional VTs may be added to facilitate the stand-alone and on-line interactive use of the Model 15

3 Loading and dumping of TEs can be carried out in two ways:

(a) Teleloading from mainframe and teledumping to mainframe
(b) Local loading and dumping to diskette using the dual floppy disc drive

4 The 7551/12 dual floppy disc drive (and 7551/16 if fitted) may be used for the following purposes:

(a) As a storage medium for the local loading of TEs (both on-line and off-line TEs); thus providing an alternative to teleload as a method of loading the Model 15

(b) As a data storage medium for use in conjunction with the T2SAx, T2SAxI or T2APxx series of TEs

Note that the file formats for the above types of diskette file are not identical and cannot, therefore, be mixed on the same diskette.

The physical characteristics of both dual floppy disc drives are as follows:

Total number of tracks per drive	77
Sectors per track	26
Bytes per sector	128
Total recording capacity per diskette	256 Kbytes
Peak transfer rate	30 Kbytes/second (approximately)

Of the 77 tracks available four are used for control purposes leaving 73 tracks for data storage proper, that is, a maximum usable disc capacity of approximately 240 Kbytes per diskette.

The one or two dual floppy disc drives are housed in the same unit as the processor. The second disc system (7551/16) is supplied with a housing unit and with a maximum 4 metres of cable to enable it to be 'daisy-chained' to the first system without the need for an additional coupler.

For further details refer to section 8 (stand-alone facilities) and section 9 (loading facilities).

5 The HCPs provide the same facilities as for the 7502/03 system:

(a) Hard copy record of a VT screen, initiated by the VT operator

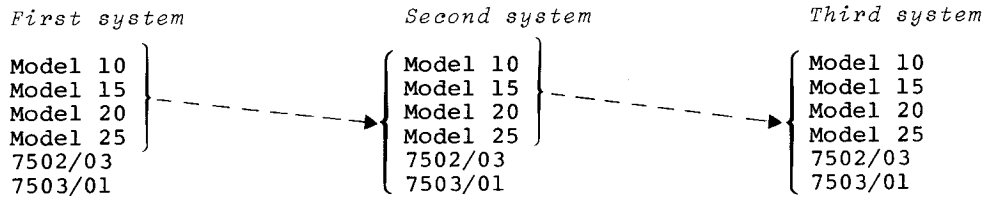
(b) Printing data sent directly from the mainframe program

Refer to the manual and Publications notice 1

6 The line printer extends the use of the Model 15 to include a remote bulk printing facility on-line to mainframe. Refer to Publications notice 3

7 The Terminal Cascade Facility (TCF) enables up to three 7500 terminal systems to be connected via a single modem to a communication line. Permissible combinations are given below. The terminals appear to the mainframe as multidropped terminals. The implications of cascaded terminals are therefore as for multidropped terminals; in particular, terminal addressing rules and mainframe constraints should be borne in mind. These are described later in this notice.

Connection is achieved by a Terminal Cascade Connector out of the rear of the first and second Model 15 system and into the second and third system respectively. The following combinations of cascaded systems are permissible:



Terminal executives

The Model 15 supports the T2Bx TEs used on 7502/03. In addition to T2Bx the basic 16 Kbytes Model 15 supports the T2Cx, T2SAx, T2SAxI, T2Ux and T2UxI series of TEs using XBM line control procedures. These series of TEs are described in section 4 of this notice together with T2IPxx, T2RBxx, T2APxx and T2ASx series of TEs which may be used on enhanced Model 15 systems. The TEs mentioned here offer the terminal user the facilities summarised as follows:

Interactive

The T2Bx and T2Cx series allow simple interactive use of VTs when online to a mainframe and also provide the optional facilities of screen validation, hard copy formatting and direct output (to HCPs). The T2IPxx series also allows simple interactive use of VTs. T2C6 and T2AP01 allow complex interactive use of VTs together with the use of diskettes

Stand Alone

The T2SAx and T2SAxI series allow VTs to be used for simple data capture to diskettes offline from a mainframe and subsequent transmission of it to the mainframe. Screen validation and hard copy formatting are optional facilities. The T2APxx series allows VTs to be used for complex data capture offline and the associated T2ASx series transmits it to the mainframe

Bulk Data Transmission

The T2IPxx and T2RBxx series transmit line printer data between mainframe and 7502. These TEs are intended for bulk transfers as in Remote Job Entry applications

Application Programming

T2AD01 and the T2APxx and T2ASx series comprise comprehensive facilities for the development of programmed screen formats using TPL (Terminal

Programming Language) and their subsequent use in either interactive or stand alone mode

Diskette Maintenance

The T2Ux and T2UxI series provide a variety of facilities for the maintenance of diskette data files and TE libraries and also enable user selected TEs to be teleloaded from the mainframe

Figure 1 illustrates the TE enhancement paths applicable to the Model 15 terminal systems. Table 2 indicates the hardware supported and software facilities provided by the TEs. Table 3 is a quick reference guide to the relationships between TEs and the associated hardware configurations.

SUMMARY OF THE MODEL 10 FACILITIES — SECTION 2

The Model 10 Interactive Terminal System supports up to 8 VTs and 4 HCPs using the T2Bx, T2Ul and T2Cx TEs. The facilities provided by the Model 10 are listed below. Where further details are appropriate reference is made to section 1.

Hardware

The hardware for the Model 10 comprises:

Basic	*Optional*
7502/05 Modular Terminal Processor with 12 Kbytes of store	Store increase of 4 Kbytes
A 7561/01 or 7561/02 Video Terminal	Extra VTs as shown in Table 3
Terminal Cascade Facility (see section 1)	Up to four 7572, 7574 or 7576 HCPs of any mix

Appendix 1 contains an equipment list of the Model 10 system.

Comparison of Model 10 and 7502/03 systems

The Model 10 is comparable to the 7502/03 but offers the following additional features:

1 9600 bps working via the appropriate T2Cx TEs and mainframe

2 Terminal Cascade Facility

3 Model 10 is convertible to a Model 15 (see Appendix 1, section A1.2)

4 Model 10 is supported with a 7595/01 housing unit to facilitate the conversion in item 3

Comparison of Model 10 and Model 15 systems

1 Model 10 only supports VTs and HCPs in an interactive mode

2 A VT in console mode is not supported

3 Selection of local load and local dump facilities via the 16 position rotary switch is not supported (see section 1 'Operational use of the hardware')

4 Model 10 supports T2Bx up to 4800 bps and T2Cl, T2C5 and T2Ul up to 9600 bps only (see section 1 'Terminal Executives')

Refer to Tables 1 and 3 for further information.

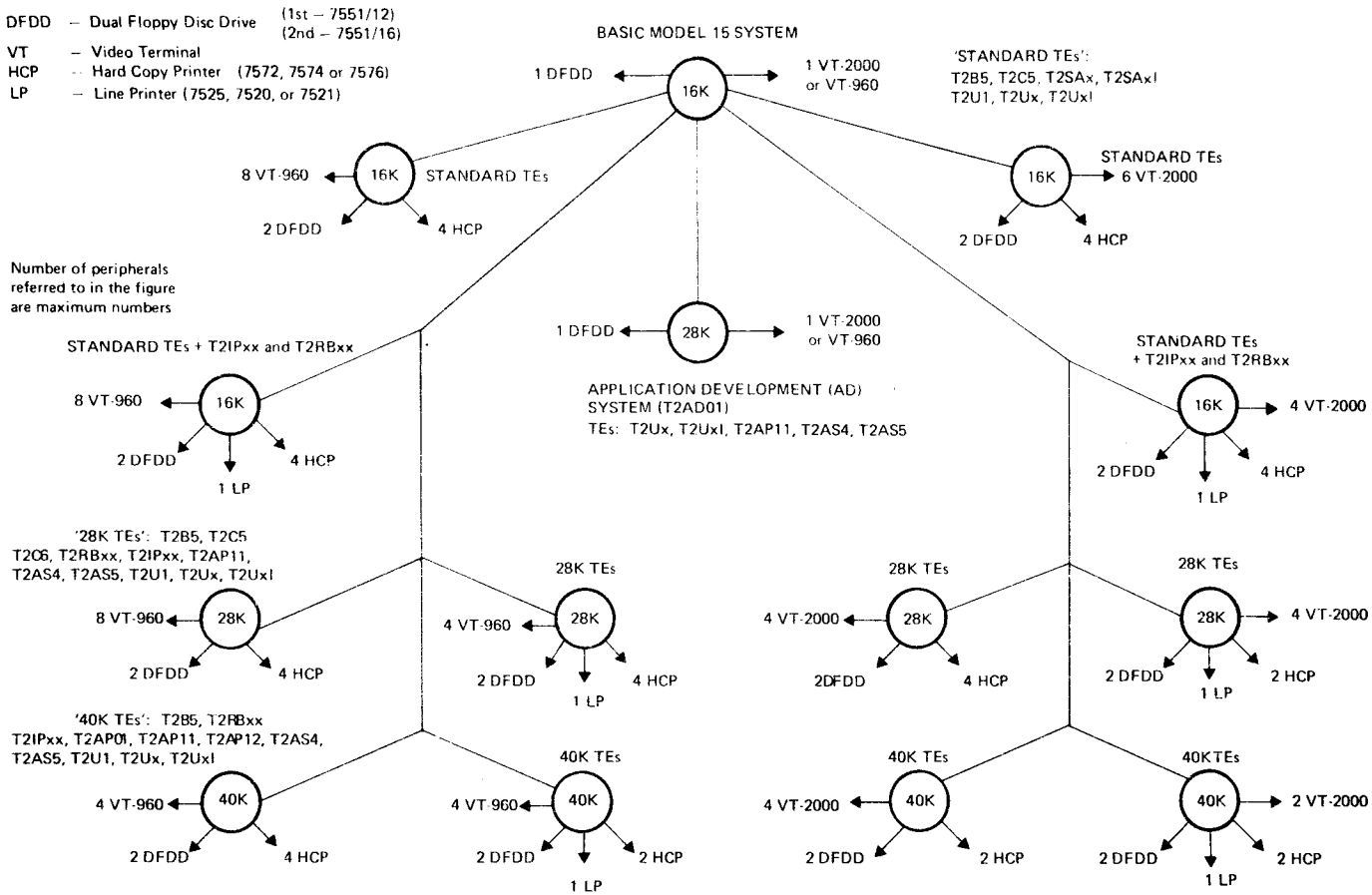


Figure 1 Model 15 Enhancement Paths

The following enhancements apply to 7503 systems:

1 A new series of TEs: the T3Cx series, that allow on-line interactive working and bulk working to take place concurrently

2 Line speeds of up to 9600 bps when using T3Cx TEs

In addition 7503 store size can be extended above 32K bytes up to a maximum of 64K bytes to cater for the increased store sizes required for mixed bulk/interactive working.

Terminal Executive	*Store size (bytes)*	*Maximum number of VT units supported*	*Maximum number of HCP units supported*	*Local hard copy supported*	*Direct output to HCP supported*	*Screen validation supported*	*Hard copy formatting supported*
T2B1	12K	8	4	yes	no	no	no
T2B2	12K	8	4	yes	yes	no	no
T2B3	12K	8	4	yes	no	yes	no
T2B4	12K	8	4	yes	no	no	yes
T2B5	16K	8	4	yes	yes	yes	yes
T2C1	12K	8	4	yes	no	no	no
T2C5	16K	8	4	yes	yes	yes	yes
T2U1	12K	1	0	no	no	no	no

Table 1 Configuration summary for the 7502/03 and Model 10 terminal systems

Table 2 *Configuration summary for the Model 15 terminal systems*

T.E.	Store size in bytes	Max. number of VTs (see note)	Max. number of HCPs (see note)	Diskette E=EBCDIC I=ISO	Line Printer	Card Reader (Not applicable to Model 15)	Needs Console PID	Online	Line Control Procedures	Screen Validation	Hard Copy Formatting	Direct Output	Local Hard Copy	TPL may be used
T2B1	12K	8	4	No	No	No	No	Yes	7181	No	No	No	Yes	No
T2B2	12K	8	4	No	No	No	No	Yes	7181	No	No	Yes	Yes	No
T2B3	12K	8	4	No	No	No	No	Yes	7181	Yes	No	No	Yes	No
T2B4	12K	8	4	No	No	No	No	Yes	7181	No	Yes	No	Yes	No
T2B5	16K	8	4	No	No	No	No	Yes	7181	Yes	Yes	Yes	Yes	No
T2C1	12K	8	4	No	No	No	No	Yes	XBM	No	No	No	Yes	No
T2C5	16K	8	4	No	No	No	No	XBM	Yes	Yes	Yes	Yes	Yes	No
T2C6	28K	4	4	I	No	No	Yes	Yes	XBM	Yes	No	No	Yes	No
T2SA1	16K	1	0	E	No	No	Yes	Yes	XBM	No	No	No	No	No
T2SA2	16K	8	4	E	No	No	Yes	No	N/A	Yes	Yes	No	Yes	No
T2SA3	16K	1	0	E	No	No	Yes	Yes	XBM	No	No	No	No	No
T2SA1I	16K	1	0	I	No	No	Yes	Yes	XBM	No	No	No	No	No
T2SA2I	16K	8	4	I	No	No	Yes	No	N/A	Yes	Yes	No	Yes	No
T2SA3I	16K	1	0	I	No	No	Yes	Yes	XBM	No	No	No	No	No
T2RB01 and T2RB11	16K	1	0	No	Yes	Yes	Yes	Yes	XBM	No	No	No	No	No
T2IP01 and T2IP11	16K	8	0	No	Yes	No	Yes	Yes	XBM	No	No	No	No	No
T2AP01	40K	4	2	I	No	No	Yes	Yes	XBM	Yes	Yes (by TPL)	Yes	Yes	Yes
T2AP11	28/ 40K	4	4/2	I	No	No	Yes	No	N/A	Yes	Yes (by TPL)	No	Yes	Yes
T2AP12	40K	4	4/2	I	No	No	Yes	No	N/A	Yes	Yes (by TPL)	No	Yes	Yes
T2AS4	28K	1	0	I	No	No	Yes	Yes	XBM	No	No	No	No	No
T2AS5	28K	1	0	I	No	No	Yes	Yes	XBM	No	No	No	No	No
T2U1	12K	1	0	No	No	No	No	Yes	7181/XBM	No	No	No	No	No
T2Ux	16K	1	1	E	No	No	Yes (except T2U6 and T2U7)	No	N/A	No	No	No	Yes	No
T2UxI	16K	1	1	I	No	No	Yes (except T2U7I)	No	N/A	No	No	No	Yes	No

Note: Maximum numbers of VTs and HCPs are due to hardware and/or software limitations (with T2Bx, T2C1, T2C5, T2SA2 and T2IPxx using the 7561/02 VTs the maximum numbers are 8 VT-960s or 6 VT-2000s)

Table 3 *Quick Reference Guide to the Relationships between TEs and Hardware Configurations*

7502 Model Number	03,10		15			20		15,20		25	Notes
Store Size (K bytes)	12	16	16	28	40	16	16	28	40	16	
VT-2000 (Max)	8	8	6	4	4	6	4	4	2	1	
VT-960 (Max)	8	8	8	8	4	8	8	4	4		
HCP (Max)	4 4	4 4	4 4	4 4	2 4	4 4	4 4	2 4	2 2		
Dual Floppy Disc Drive (Max)			2 2	2 2	2 2		2 2	2 2	2 2		
Line Printer						1 1	1 1	1 1	1 1	1	
Card Reader										1	
T2B1,2,3,4	A	d	d	d	d	d	d	d	d	f	1
T2B5		A	B	c	c	B	B	c	c	f	1
T2C1	A	d	d	d	d	d	d	d	d	f	1
T2C5		A	B	B	d	B	B	B	d	f	1
T2C6				A B	d			B	d		1,4
T2SA1,3			B	d	d		B	d	d		
T2SA2			A	d	d		B	d	d		
T2SA1I,3I			B	d	d		B	d	d		4
T2SA2I			A	d	d		B	d	d		4
T2RB01, T2RB11						B	B	c	c	A	2
T2IP01, T2IP11						B	B	c	c	f	1,2
T2AP01					A				B		1,4
T2AP11				A B	A			B	B		3,4
T2AP12					A				B		
T2AS4,5				B	B			B	B		4
T2U1	B	B	B	B	B	B	B	B	B	c	
T2U2,3,4,6,7			B	e	e		B	e	e		
T2U2I,3I,4I,6I,7I			B	B	B		B	B	B		4

A = Capable of using all store and peripherals and is intended for the configuration.
B = Does not use all store and/or peripherals but is intended for the configuration.
c = Can be used but is not usually associated with the configuration.
d = Should not be used because its facilities are wholly contained in a larger TE.
e = Should not be used because it uses the wrong diskette index track recording standard.
f = Is not permitted.
blank = Cannot be used due to insufficient store and/or peripherals.

Notes

1 2903/2904 cannot support interactive XBM at present and uses only T2Bx for interactive operation. It is not planned for VME/B to support interactive XBM

2 2903/2904 cannot support T2IPxx, so only T2RBxx can be used.

3 T2AP11 will use all 40Kb of store if present

4 ISO recording on diskette index track

T2Bx series of TEs

T2B1, T2B2, T2B3, T2B4 and T2B5 TEs provide facilities for on-line interactive operation identical to those provided by 7502/03. The on-line transfer speeds are 600, 1200, 2400 and 4800 bps. These TEs use the same line control procedures as a QLSA (Queuing Line Sharing Adaptor) with 7181/2 videos. Refer to the manual and Publications notice 1.

T2Cx series of TEs

T2C1 and T2C5 TEs also support on-line interactive working. They provide functionally identical facilities to their T2Bx counterparts, except in the following respects:

1 T2Cx use Extended Basic Mode (XBM) line control procedures (in common with all the following TEs which operate on line)

2 T2Cx operate at line speeds of up to 9600 bps for Model 10 and 15 systems and up to 4800 bps for 7502/03 systems. (T2Bx operate at line speeds up to 4800 bps)

3 The direct output facility is implemented differently in T2Cx (see section 6)

4 PID data is encoded differently (see section 5)

T2C1 provides the basic facilities and is capable of handling up to eight VT-2000 or VT-960 units and up to four 7572, 7574 or 7576 HCPs of any mix. The HCPs can only be used to take local hard copy from the VT. Screen validation, hard copy formatting and direct output facilities are not provided. The TE requires 12K bytes of store.

T2C5 provides the basic facilities of T2C1 and in addition provides facilities for screen validation, direct output and hard copy formatting. The TE requires 16K bytes of store.

T2SAx and T2SAxI series of TEs

Many applications are not truly interactive in nature; for example, where the video operator does not require information from the mainframe system, but simply enters data into specified fields in a prepared screen format and transmits the information to the mainframe for subsequent processing. In such systems, involvement of the mainframe is unnecessary, and is wasteful in terms of line and mainframe costs.

The T2SAx and T2SAxI TEs provide an alternative method of operation for the Model 15 system, when on-line interactive working with the mainframe is not required. Applications of this nature will benefit greatly from *Stand-Alone* working, since for a large propoertion of the total working time while the data is being entered at the VTs the terminal system is working off-line from the mainframe system, hence giving a significant saving in line costs.

During off-line operation, the VT operators enter variable data onto the screen in the usual way, but since there is no link to the mainframe the entered data is not transmitted when the SEND key is pressed. Instead, the entered data is stored on diskette. At some later stage, an on-line connection is made and the data is transmitted to the mainframe.

There are two versions of the Stand-alone TEs, namely the obsolescent T2SA1, T2SA2, T2SA3 set used with EBCDIC labelled diskettes and the T2SA1I, T2SA2I, T2SA3I set used with ISO labelled diskettes. The two sets cannot be mixed and each set must be used only with the appropriate EBCDIC or ISO sets of utilities for initialising, copying files and the like.

The purpose and the facilities of the EBCDIC and ISO versions of these TEs are described below. Both versions have exactly the same purpose and facilities.

A more detailed examination of how to use the Stand-alone system is contained in section 8 of this notice.

1 T2SA1 and T2SA1I

T2SA1 and T2SA1I operate on-line to the mainframe, using XBM line control procedures at line speeds of up to 9600 bps. The TEs accept

VT screen formats from the mainframe and store them in a file on diskette. Communication between the mainframe application program and terminal system operator can take place via a VT in console mode (that is with a console PID inserted).

The screen formats are used subsequently in T2SA2 and T2SA2I (see below) to provide 'blank' forms into which the operator can insert data.

Screen validation parameters can be embedded in the screen formats to provide validation facilities during off-line operation with T2SA2 and T2SA2I.

T2SAl and T2SAlI require 16K bytes of 7502 store

2 T2SA2 and T2SA2I

T2SA2 and T2SA2I operate off-line from the mainframe system and are capable of handling up to six VT-2000 or eight VT-960 units and up to four 7572, 7574 or 7576 HCPs of any mix.

T2SAl and T2SA2I provide an environment similar in nature to that of the on-line interactive T2Bx and T2Cx systems with screen validation and local hard copy output facilities functioning in an identical fashion to the on-line system. However, there is no interaction with the mainframe. The VT operator is responsible for calling up a particular screen format from a file on diskette previously created by T2SAl or T2SAlI. Data is then entered by the operator into the unprotected fields in the usual way. On completion of entry of data, and after performing any hard copy and validation error correction necessary, operation of the SEND key causes the keyed in data to be written to a file on diskette. Facilities included in T2SA2 and T2SA2I enable automatic selection and display of a further user-speciified screen format.

T2SA2 and T2SA2I require 16K bytes of 7502 store

3 T2SA3 and T2SA3I

T2SA3 and T2SA3I operate on-line to the mainframe, using XBM line control procedures, at line speeds of up to 9600 bps. T2SA3 and T2SA3I transmit stored data files, created by T2SA2 and T2SA2I respectively, to the mainframe. Communication between the mainframe application program and the terminal system operator can take place via a VT in console mode (that is, with a console PID inserted).

T2SA3 and T2SA3I require 16K bytes of 7502 store

T2Ux and T2UxI series of TEs

There are two sets of diskette utility TEs. The T2UxI set (T2U2I, T2U3I, T2U4I, T2U6I and T2U7I) uses ISO labelling on the diskettes while the T2Ux set (T2Ul, T2U2, T2U3, T2U4, T2U6 and T2U7) uses the obsolescent EBCDIC labelling. Both versions are described below.

These TEs provide utility functions for 7502 terminals. All the utilities, except T2Ul, operate off-line and are concerned with the floppy discs. They can therefore only be used with a 7502 system supporting floppy disc drives. Note that a VT in console mode (that is, with a console PID inserted into the reader) is required in order to use the T2U2-T2U4 and T2U2I-T2U26I utilities. Diskette handling has been improved in T2UxI to give better file security necessary in conjunction with T2ADOl, T2APxx, T2ASx and T2C6. This has resulted in some differences in the operator commands.

1 T2Ul menu select

T2Ul allows the terminal operator to select, via a VT keyboard, the TE he wishes the mainframe to teleload. The TE selected is teleloaded in the usual manner at line speeds of up to 9600 bps on the Model 10 and Model 15 or 4800 bps on the 7502/03.

T2Ul requires 12K bytes of 7502 store

2 T2U2 and T2U2I diskette initialiser

T2U2 and T2U2I initialise a diskette to the format required by the Model 15. Note that it is essential to format all new diskettes before use.

T2U2 and T2U2I operate off-line from the mainframe and require 16K bytes of 7502 store

3 T2U3 and T2U3I diskette volume copy

T2U3 and T2U3I copy the entire contents of the diskette (excluding the first seven sectors which include the diskette qualifier) to another diskette. T2U3 and T2U3I operate off-line from the mainframe and require 16K bytes of 7502 store

4 T2U4 and T2U4I diskette file copy

T2U4 and T2U4I copy data from one file to another. The files may be on the same diskette or on separate diskettes.

T2U4 and T2U4I operate off-line from the mainframe and require 16K bytes of 7502 store

5 T2U6 and T2U6I diskette file display

T2U6 and T2U6I are used to display the content of named files on diskette on the VT acting as console. They also support an HCP, which may be used to obtain a hard copy record of the VT display. In addition T2U6I allows displayed data to be amended and written back to diskette. As supplied, T2U6 does not require the use of a console PID.

T2U6 and T2U6I operate off-line from the mainframe and require 16K bytes of 7502 store

6 T2U7 and T2U7I diskette menu select

T2U7 and T2U7I enable the terminal operator to select and load a particular TE required for use from a previously created diskette library (see section 9).

T2U7 and T2U7I operates off-line from the mainframe and require 16K bytes of 7502 store

T2RBxx series of TEs

T2RB01 and T2RB11 TEs enable bulk data to be transmitted between mainframe and 7502 for printing on a line printer. The TEs require a console VT for operator communication with the mainframe and local control of the TE.

1 T2RB01 supports the 7525/02 line printer (and a card reader for Model 25 applications). This line printer does not have a format loop mechanism; vertical tabulation control is carried out by the TE using either a software default loop or one sent from the mainframe. The TE is suitable for standard RJE (Model 25 systems only) or Remote Printing situations online either to a mainframe operating system or user application program. Refer to *7502 Planning and Implementation: Remote Printing and Remote Batch Systems* (RP1012)

2 T2RB11 is the same as T2RB01 except that this TE supports the 7520/11 and 7521/11 line printers instead

T2IPxx series of TEs

T2IP01 and T2IP11 TEs combine the facilities of T2C1 and T2RBxx to provide both interactive and printing requirements. It is locally suited to situations where a large volume of print data is required at the same location concurrently with a small volume of interactive video traffic.

1 T2IP01 supports the simultaneous use of a 7525/02 line printer and up to six VTs. Vertical tabulation control of the line printer is carried out by the TE as for T2RBxx. HCPs are not supported. For operator communication with the mainframe or local control of the TE when the line printer is in use one of the VTs must be converted to a console VT using a Console PID. Refer to Publications notice 3

2 T2IP11 is the same as T2IP01 except that this TE supports the 7520/11 and 7521/11 line printers instead

T2APxx series of TEs

T2AP01, T2AP11, and T2AP12 Application Programming TEs offer on-line and off-line environments for developing and using TPL (Terminal Programming Language) coded Action Routines in a variety of ways for processing data input from VTs on the 7502. They enable the 7502 to be used as a highly intelligent terminal system in situations where the facilities provided by T2Bx, T2Cx, T2SAx and T2SAxI are inadequate and/or where it is required to reduce line traffic and mainframe activity to a minimum.

1 T2AP01 provides an interactive environment for using programmed screen formats from Application Programming (AP) Library on diskette for on-line data captures and enquiries. T2AP01 supports the use of up to four VTs and two HCPs. A console VT is required for supervisory commands to the TE. Refer to Publications notice 4

2 T2AP11 provides a stand-alone environment for using programmed screen formats from an AP library for off-line data capture. The TE supports the user of up to four VTs and up to four HCPs. A console VT is required for supervisory commands to the TE. At other times it can be used as a standard VT.

T2AP11 also provides the environment for using the Application Development System T2AD01. When used for this purpose a single VT is used with a Development PID inserted. One HCP may also be used for taking permanent records. Refer to Publications notice 3

3 T2AP12 provides all the facilities of T2AP11 and in addition allows spooled video records to be retrieved for second key verification or modification

T2C6 TE

T2C6 TE provides a similar operating environment to T2C1 or alternatively allows the use of screen formats created under the AP Development System T2AD01 for interactive transmission of screen data to and from the mainframe. T2C6 does not support the use of programmed screen formats as under T2AP01 but does support the use of screen validation. It can handle up to four VTs and up to four HCPs. HCPs may be used for local hard copy only. A console VT is required for supervisory commands to the TE. At other times it can be used as a standard VT by removing the console PID. Refer to Publications notice 4

T2ASx series of TEs

T2AS4 and T2AS5 TEs transmit to and from the mainframe files created by or intended for T2APxx TEs and the Application Development System T2AD01. Both TEs require the use of a console VT for operator communication with the mainframe and supervisory control of the TE. Refer to Publications notice 3

1 T2AS4 receives Reference Files and AP Libraries from the mainframe and stores them on diskettes for subsequent use under T2APxx TEs and T2C6 (AP Libraries only). The Reference Files will have been created in the mainframe and the AP Libraries will have been created on a 7502 under T2AD01 and sent to the mainframe by T2AS5

2 T2AS5 sends Spool Files and AP Libraries from diskettes to the mainframe. The Spool Files will have been created under T2AP11 or T2AP12 and the AP Libraries under T2AD01

T2AD01 system

T2AD01 called the Application Development System comprises a Development Library of TPL programmed screen formats which, under the control of T2AP11, a terminal programmer can create and maintain a User Library of screen formats and Action Routines for subsequent use under the T2APxx series and T2C6 (not ARs). Refer to Publications notice 3

This section describes the implications of the 7502 enhancements for the mainframe applications programmer.

Programming for interactive video systems

T2Bx SYSTEMS

Mainframe application programming for T2Bx systems is as described in Chapter 5 of the manual with additional and amended information given in Publications notice 1.

T2Cx SYSTEMS

The mainframe applications program interface to T2Cx TEs differs in the following respects from T2Bx:

The direct output facility is implemented differently (see section 6)

Under T2Cx TEs PID data is included in messages from the terminal system only if a PID device is present in the PID reader. Under other circumstances (that is, no PID device in the reader or no PID reader fitted to the VT) the complete PID field, including the <IS4> delimiters, is omitted from the message

The PID data transmitted to the mainframe by T2Cx TEs is encoded as two ISO characters:

4/s *4/t*

where *st* together form an 8 bit binary value in the range 0 to 250, with *s* as the most significant four bits. Thus 19 would be encoded as 4/1 4/3

Programming for stand-alone facilities

Since stand-alone facilities have not hitherto been available they will require the development of new mainframe applications programs in order to exploit the facilities. The implications of these facilities on mainframe applications programming is described in section 8.

Using T2Cx systems with existing applications programs and packages

Providing that the necessary mainframe support is available (see section 10) the following applies:

ICL APPLICATIONS PACKAGES

All current ICL and Dataskil programs written for 7181/2 visual display units (for example, Dataview and Vidimop) will work unchanged in the following environments:

1900: via 7920 or 7930 scanner-only or 7903 Communications Processor providing that the applications program interfaces with Communications Manager.

2903: via the integrated video coupler with ETS2 only.

System 4: via MCCCU with CCP

VTs with PID readers should not have the PID inserted.

For connection to 1900 via a local or remote 7905, user own coding will be required in the 7905 in order to fully support 72Cx systems.

There is no support from the 7903 Emulator Turnkey Package on 7905 as this does not support XBM line procedures.

USER-WRITTEN APPLICATIONS PROGRAMS

In addition to the necessary mainframe support conditions the following applies.

On 1900 systems using 7920 or 7930 scanner-only or 7903 Communications Processor connections, user-written programs must interface with Communications Manager.

Connections via local or remote 7905 will require either user own coding in the 7905 or amendments to the mainframe user-written program.

Application programs using the direct output facility of T2Bx or using PID data will require amendment in order to run T2Cx.

DIRECT OUTPUT UNDER T2Cx TES — SECTION 6

As under T2Bx, data can be transmitted directly from the mainframe to an HCP thus providing a dual role for the HCPs for *local output* from the screen when the VT operator presses the PRINT key or for *direct output* from the mainframe.

All HCPs attached to the terminal may be explicitly addressed by the mainframe for use as direct output devices (see section 7). It is, therefore, possible for a given HCP to be used for local output at one time and for direct output at another time.

There are differences between the implementation of direct output in T2Bx and T2Cx system.

With T2Bx systems the mainframe user interface to the direct output facility requires that all printing is broken down by the user written application program into 128 character blocks and additionally requires the user to handle certain exception conditions such as paper low. However, the T2Bx Direct Print facility does provide, at the 7502 end, for the concurrent operation of up to four HCPs.

With T2Cx systems, the mainframe user interface to direct output is more simple. The HCP appears to the application program as a remote line printer. The mainframe interface permits single messages of over 2000 characters to be accepted, with the mainframe software fragmenting the messages into blocks suitable for transmission to the terminal for certain mainframes, notably 1900. However, each HCP has the use of only one 256 byte buffer at a time so transfers will not be overlapped with printing as for the T2Bx series.

Note, however, that for both T2Bx and T2Cx systems the direct output facility is not suitable for printing large volumes of data. It is intended for low volume intermittent printing, such as that often required in transaction processing applications, where the processing of a transaction involves the printing of a small volume of data: often just a single form.

7502 TERMINAL ADDRESSING UNDER XBM PROCEDURES — SECTION 7

The address of a device under XBM procedures is in two parts consisting of two ISO characters as follows:

1 The base address of the terminal and

2 The address of the device itself

Thus two devices attached to different terminal systems on the same line may both have the same device address. This addressing system is exploited by assigning fixed addresses to individual devices (see below). Multidrop configurations are catered for by assigning different base addresses to each terminal on the line. Terminal cascading, using TCF, appears to the mainframe as a group of multidropped terminals and so the same considerations apply.

Terminal base addresses

The following base addresses may be used as 7502 terminal addresses:

2/0, 2/8, 3/0, 3/8, 4/0, 4/8 ... up to 7/8

The address to which an individual 7502 responds is controlled by an internal hardware switch, the switch can be altered on site during commissioning but is initially set before delivery to 2/0.

Device addresses

The following fixed addresses are assigned to individual devices on a 7502 system:

Device	*Address*
Console device	2/2
Video terminals	3/0 to 3/7 (one address per video)
Hard copy printers	5/0 to 5/3 (one address per HCP)
Floppy disc	2/12 and 2/13

Notes:

1 Any VT with a PID reader may be nominated as the console device by inserting a console PID into the PID reader. (Under most circumstances the VT, included as part of the Model 15 system package is used as the console.)

With the console PID inserted the VT responds to the console address 2/2 rather than to its address. The VT reverts to normal use and normal VT address when the console PID is removed

2 Floppy disc addresses can be used only during the stand-alone operation using T2SA1, T2SA1I, T2SA3 or T2SA3I (see section 8)

Teleload and teledump addresses

When the terminal is being teleloaded or teledumped the line protocol used is the same as that used for T2Bx operation, regardless of whether the TE being loaded is from the T2Bx, T2Cx, T2SAx, T2SAxI or T2Ux series.

Both teleload and teledump use two addresses, which are formed by adding 4 and 5 to the base address of the terminal.

For example, a terminal with an address of 2/0 has teleload/teledump addresses of 2/4 and 2/5. Normally, only the first of these needs to be supplied to mainframe communication software when the terminal addresses are specified.

USING THE STAND-ALONE FACILITIES OF THE T2SAx AND T2SAxI TEs SECTION 8

The purpose and a general description of the stand-alone TEs has been given earlier, in section 4. This section describes in more detail the tasks that need to be performed in order to make use of the stand-alone facilities offered on Model 15 systems. In particular, the section describes the functions performed by the mainframe applications programmer, terminal system operator and VT operator while using the stand-alone facilities. Message formats for the input and output spooling operations are also given. Though this is not its prime purpose a Model 20 system fitted with an optional dual floppy disc drive can support the T2SAx and T2SAxI TEs.

Basically, stand-alone operation involves three phases:

1 An output phase, when the screen formats are transmitted to the Model 15 terminal system and stored in a file on diskette. This process uses T2SA1 or T2SA1I

2 A stand-alone phase, when individual VT operators retrieve screen formats from the files on diskette, key data into unprotected fields in the format and SEND the keyed-in data. The data is stored on a file on diskette for later transmission or physical transportation. This phase is performed off-line, using the T2SA2 or T2SA2I TE

3 An input phase, when the data created at stage 2 is transmitted as a batch of data to the mainframe for subsequent processing. This input phase uses T2SA3 or T2SA3I

The three phases of stand alone operation involve the following six tasks:

1 The creation of screen formats at the mainframe site and the storing of these formats for subsequent transmission to the terminal system

2 Transmission of these formats, under the control of a mainframe applications program or utility (depending on mainframe system) to the terminal system for storage in a diskette file

3 Administrative tasks performed at the terminal by the terminal system operator to:

(a) initialise and label diskettes for subsequent use

(b) receive the screen formats transmitted from the mainframe

(c) oversee the task of data entry, deal with full diskettes, etc.

(d) return data files to the mainframe

4 VT operating tasks: calling formats and completing screen formats

5 Reception at the mainframe site, under the control of a mainframe applications program or utility, of the transmitted data and the storing of this data in a file for sequequent processing

6 Subsequent processing, in batch mode, of the VT data (possibly with further data from the same or other 7502 terminals)

Detailed information on terminal system operating and VT operating are described in *7502 Operating* (TP4804), Publications notice 2 and *Operating 7500 Range Video Terminals* (TP4803) Publications notice 2, respectively.

Creating and transmitting screen formats

Transmission of screen formats to the Model 15 is controlled by a user-written applications program or the Dataskil package SPODE on 1900 and System 4 mainframes and by the ICL supplied utility XJXV on 2903 and 2904 mainframes.

The screen formats should be created and stored in a disc file at the mainframe, ready for transmission to the terminal system under the control of the program or utility. The terminal system accepting the screen formats must be loaded with T2SA1 or T2SA1I.

MESSAGE FORMAT REQUIRED BY T2SA1 AND T2SA1I

Each screen format should be transmitted to the 7502 in the following format:

<STX> <FE1> *xtt xnn* <FE5> *screenformat* <ETX> / <ETB>

<STX> and <ETX> or <ETB> are part of the transmission envelope and are not normally the concern of the mainframe application program.

<FE1> *xtt xnn* <FE5> is a character sequence identifying this particular format and its successor and is made up as follows:

x is an upper case character in the range A to Z

tt is a two digit number in the range 00 to 31

nn is a two digit number in the range 00 to 31

<FE1> and <FE5> delimit the additional field

The three character sequence *xtt* is the identifier to be associated with the current screen format. It is used by the VT operator, during subsequent stand-alone operation, to call this particular screen format. Each screen format is thus given a unique identifier from the sequence A00, A01, A02 .. A31, B00, B01, ... etc. to ...Z31.

The second character sequence *xnn* is the identifier of a further screen format to be associated with the current format. Its effect during subsequent stand-alone operation is as follows:

Once the VT operator has completed the screen format and SENT the keyed-in data, the next format (as defined by *xnn*) is retrieved from the diskette screen format file and displayed on the screen. Thus, a fixed sequence of screen formats can be presented to the VT operator. The new format will be displayed on the screen from its first position which is not an unprotected space to its last position which is not an unprotected space. This will enable interleaving or multiple format displays on a single screen if so desired.

If automatic retrieval of screen formats is not required then *xnn* should be set equal to *xtt*. This will cause the unprotected fields to be cleared to spaces or special underline depending on the screen control mode parameter once their contents have been stored in diskette.

The *screen format* field in the above message format should be made up as follows:

1 Screen control mode parameters (optional)

2 Print formatting program (optional)

3 Screen data (including screen validation parameters if required)

Any screen control mode parameters, print formatting programs or screen validation parameters present in the message will invoke the screen control print formatting or screen validation facilities, respectively, when the terminal system is operating off-line with the T2SA2 or T2SA2I TEs. These facilities are described in the following sections of the manual:

Screen validation: section 5.2

Print formatting: section 5.3.1

Screen control: section 5.2.2

Notes:

1 A file of screen formats on diskette can contain up to 26 sets (A to Z) of up to 32 screen formats (00 to 31), giving a maximum of 832 screen formats per file

2 The called format *xnn* must be from the same set as the current format *xtt*. For example, if *xtt* is A09 then *xnn* must be in the range A00 to A31. Automatic retrieval of screen formats thus allows up to 32 screen formats to be called. The operator may, however, at any time, gain access for local input and key in a BF command (see *7502 Operating* (TP4804)) to call a screen format from any other set, effectively gaining access to automatic retrieval facilities in the called set

3 The bottom line of a VT screen is used to display screen validation error messages and to display terminal system messages (for example, a "diskette full" message). The last line should therefore not be used

TRANSMITTING FORMATS TO THE TERMINAL

Prior to transmission of screen formats, the terminal operator must initialise a diskette, load the T2SA1 or T2SA1I TEs and assign a file on the diskette to receive the screen formats (see *7502 Operating*, Publications notice 2).

This file may then be written to by the mainframe application or utility using the floppy disc sink address 2/13. The mainframe application program may communicate with the terminal system operator during transmission via the VT nominated as the console. The console device address 2/2 should be used for this purpose (see section 7).

It is not necessary to transmit screen formats in any defined order. However, it is recommended that formats which are expected to be most frequently used should be transmitted together to minimise head movement when retrieving from diskette, thus ensuring that formats are retrieved in the shortest time.

A <DC2> control character must be included as the last character of the final *text* to the floppy disc sink address (that is, immediately preceding <ETX>) to indicate to the terminal system that transmission of screen formats is complete. T2SA1 and T2SA1I automatically close the newly created screen format file after the final message has been received.

After a file has been assigned to receive screen formats the assignment cannot be aborted. A close file (CF) command will fail "error FL". The file is deassigned and closed normally when the final screen format (ending in DC2) has been received.

Should a file be left in an open state at the end of a T2SA1 or T2SA1I run it will have to be closed using the TF command in T2U2, T2U2I, T2U4 or T2U4I before it can be used in any way again.

It should be noted that access to the file holding screen formats on diskette is in "append" mode and that it is therefore possible to rerun T2SA1 or T2SA1I at any time to add further screen formats to a given file.

If a previously used identifier is transmitted, the space used by the earlier version of the format is not released, becomes inaccessible and the identifier now refers to the current version of the format.

Stand-Alone operation under T2SA2 or T2SA2I

Before stand-alone operation can commence the terminal operator using the VT in console mode carries out the following tasks:

1 Assigns a file containing screen formats by use of the GA command

2 Assigns a file for reception of screen data by use of the GA command

3 Overrides the default Video Identifier by use of the IV command, if required

4 Open alternative files (by OF command) to the global ones made available in steps 1 and 2 to enable individual VT operators to assign themselves to these files by use of the AS command. (If such operators subsequently deassign from these files they become automatically assigned to the global ones)

Up to 19 separate files may be created on one diskette. A mixture of screen format files and data files (as produced by T2SA2 or T2SA2I) may reside on the same diskette. (Note, however, that for performance and system operation reasons stand-alone operation with the screen formats file on one drive and the data file on the other drive is to be preferred.) Each file is identified by an eight character identifier (upper case characters only).

When the above operations have been completed the VT operators can commence normal operation.

During stand-alone operation, the VT operator requests the display of a screen format, enters data in the unprotected fields, validation and hard copy output required and finally presses SEND to write the entered data to a data file on diskette. Automatic retrieval and display of the next screen format then takes place. (If the same format is called, the unprotected fields are simply cleared to spaces.) Other screen formats may be called explicitly at any time, if required.

The VT operators continue until either the data file is full or there is no more data to be entered. When the file becomes partly full the VT operators are warned of this event by a message displayed on the bottom line of the VT screen. A number of further records may be added before the file becomes full. If this happens another message is displayed when the next attempt is made to write a record. The record is not written and the file is left open. If further data is to be entered then the terminal operator must assign a further file to receive data.

Transmission of keyed in data to the mainframe

Having produced a file of keyed in data on diskette, the data should then be transmitted to the host mainframe for processing. This may be accomplished using the same Model 15 system used to generate the data or alternatively, the diskette containing the data may be physically transported to another Model 15 and transmitted to the mainframe from that terminal system. TE T2SA3 or T2SA3I is required.

Prior to transmission, the terminal system operator must assign the data file to on-line use (see *7502 Operating*, Publications notice 2).

The file may then be read by the mainframe applications program, using the *floppy disc source address* 2/12. The mainframe applications program may communicate with the terminal system operator during the transmission via the VT nominated as the console. The console device address 2/2 should be used for this purpose (see section 7).

MESSAGE FORMAT RETURNED BY T2SA3 AND T2SA3I

The screen data recorded on diskette and subsequently transmitted to the mainframe consists of the unprotected data fields entered by the VT operator together with information identifying the VT used, the screen format used and the personal identification device (PID) data (if any).

The full message format transmitted to the mainframe is:

<STX> *video number* <IS4> *PID data* <IS4> <DC3> *xtt text* <ETX> <ETB>

<STX> and <ETX> or <ETB> are part of the transmission envelope and are not normally the concern of the mainframe applications program.

video number is a three character field identifying the VT number from which the message originated (as assigned by the terminal operator piror to stand-alone operation), and takes the form:

4/*p* 4/*q* 4/*r*

where *pqr* together form a 12 bit binary value, in the range 0 to 4095, with *p* comprising the most significant four bits. Thus, video number 327 would be encoded as 4/1 4/4 4/7.

<IS4> *PID data* <IS4> identifies the personal identification device information. *PID data* consists of two encoded characters in the form:

4/*s* 4/*t*

where *st* together form an 8 bit binary value in the range 0 to 250 with *s* as the most significant four bits. The whole field (including <IS4> characters) is omitted if a PID is not present in the PID reader or if the VT has no PID reader.

xtt identifies the screen format used for this message as described earlier under *Creating and transmitting screen formats*.

text is the screen data as entered by the VT operator and consists of all the unprotected data contained between SOM (start of message) and the character position immediately preceding the cursor at the time the SEND key was pressed. Each unprotected field is preceded by <DC3> (start of unprotected flashing filed) or <DC4> (start unprotected steady field) as obtained from the screen format. Thus, *text* comprises:

<DC3>		<DC3>		<DC3>	
or	*Field 1*	or	*Field 2 ...*	or	*Field n*
<DC4>		<DC4>		<DC4>	

A <DC2> character as the last character of *text* signifies that the transmission of data is complete.

Notes:

1 The data from each screen is held on diskette in an integral number of 128 byte sectors. However, only the actual data is transmitted to the mainframe and not the additional fillers used to form complete sectors

2 Data is transmitted to the mainframe in the same order in which it was written to diskette, that is, in the order determined by the keying in and sending of screen data from individual video terminals. Thus, data from one VT will be interleaved with data from other VTs

3 A record may consist of a number of diskette sectors. If a sector is unreadable for any reason, the entire text following *xtt* is replaced by a <CAN> character. Up to two records may be lost under these circumstances if, for example, the last sector of a record is the unreadable one thus preventing detection of end of record. Transmission continues normally after re-establishment of record boundaries on diskette.

EBCDIC and ISO variants of the TEs

When a diskette is initialised the index track (track 0) is set up with either an EBCDIC or an ISO character representation. Subsequent use of the diskette must maintain the standard thus established.

T2SA1, T2SA2, and T2SA3 are the obsolescent EBCDIC versions of the Stand Alone TEs and must only be used in conjunction with the EBCDIC versions of the utility TEs, that is with the T2Ux series not the T2UxI series. ISO and EBCDIC versions cannot be mixed.

Users changing from the EBCDIC set to the later ISO set (T2SAxI) must also change to the T2Ux1 set of utilities. Furthermore, screen formats stored on EBCDIC labelled diskettes cannot be used with the T2SAxI set and users must reinitialise their diskettes, recreate files and retransmit screen formats using the T2UxI utility TEs and T2SA1I.

This section describes the facilities available and the general procedures to be followed when setting up a 7502 terminal system for operational use. Detailed operating instructions for each stage in the setting up procedure are described in *7502 Operating* (TP4804), Publications notice 2.

Distribution of TEs

Distribution to licensed sites will continue to be sent to the owning mainframe site only. Distribution will be on magnetic tape, exchangeable disc store, cards or paper tape depending on mainframe supporting software and customer requirement.

By using the appropriate mainframe teleload utilities, the TEs may be loaded into the terminal processors connected to the mainframe, and then run or alternatively dumped to diskette.

If desired, a file of TEs may be set up on diskette. Loading from floppy disc may then be used as a preferable alternative to teleloading.

On-line menu selection

The T2Ux utilities include the T2U1 on-line menu select TE. When loaded into the 7502, T2U1 will display a list of up to nine further TEs that can be loaded from the mainframe. The terminal operator may select the TE required, which will then be loaded into the 7502.

On-line menu slection may be used on any 7502 systems. If used on the 7502/03, T2U1 must be the first utility in the mainframe file, and so will always be loaded initially.

On other 7502 systems, the rotary switch on the processor enables the terminal system operator to choose between the menu select TE and one other, typically the one in common use.

At the mainframe, the file of TEs should be set up so that T2U1 is the first TE (logically numbered 0) and the standard TE is second (numbered 1). Further TEs, to be loaded via the menu select facility should be logically numbered from 2 to 9.

The methods of achieving this set-up on specific mainframes are as follows:

1900 SERIES The mapping parameters supplied to utility #XTLB should specify a TE reference (*t*) of 80 for T2U1 and a reference of 81 for the standard TE. Further TEs required should be given references 82 to 89 (see the 7500 Range publication *1900 Utilities for 7500 Terminals* (TP4805), section 2.5.4).

SYSTEM 4 J-LEVEL The module number *nn* supplied on the //AMEND *nn*,INSERT,U,H card when the TE modules are inserted onto the system disc, should specify 00 for T2U1, 01 for the standard TE and 02 to 09 for any further TEs (see the 7500 Range publication *System 4 Teleload Utilities* (TP4806), section 2.1).

SYSTEM 4 MULTIJOB The module number *nn* supplied on the // CREATE TELE*nn* card should specify 00 for T2U1, 01 for the standard TE and 02 to 09 for any further TEs (see *System 4 Teleload Utilities* (TP4806), section 2.2.)

2903 SYSTEMS The mapping parameters supplied to utility #XTLA should specify a reference (*t*) of 80 for T2U1, 81 for the standard TE and 82 to 89 for any further TEs (see the 7500 Range publication *2903 Utilities for 7500 Terminals* (TP4807), section 2.5.4).

The choice of TE available for loading, displayed on the terminal operators VT, includes an ICL supplied name for each TE. The user should arrange his mapping parameters to match the display.

Local loading of TEs

Local loading of TEs is possible on Model 15 systems.

Individual TEs may be teleloaded into the 7502 and then dumped onto individual diskettes. They may be subsequently reloaded and run as required. A more satisfactory arrangement is to create a diskette based file of TEs from which the terminal operator can load any one of a number of TEs. Up to 15 TEs (excluding diskette menu select) can be held on a diskette.

Once the library has been set up, loading is carried out off-line from the mainframe system. The method of operation is similar to that used for on-line selection and teleloading but using the diskette based menu select utility T2U7. The procedure for creating a library of TEs on diskette is described in *7502 Operating* (TP4804), Publications notice 2.

The diskette menu select utility, T2U7, provides facilities for:

1 Creating and maintaining a TE library and index

2 Displaying a list of the TEs in the library

3 Loading requested TEs

Facility 1 requires a Model 15 system with two functioning floppy disc drives.

T2U7 is loaded from a previously created diskette based library file. The utility displays a list of TEs available from which the required one can be selected. Following selection, the TE is located on the diskette and loaded into the 7502 store.

Physical transportation of library diskettes and dump diskettes

It is possible to dump TEs onto diskette at one Model 15 site and then physically transport the diskette to a different Model 15 (possibly one with no on-line capability) and use them, provided that the store size of the 7502 used to create the TEs is large enough to hold the largest TE and that the second 7502 has a store size large enough to accommodate the TE to be loaded.

The above facility enables, for example, a diskette containing a TE library to be set up at one Model 15 site, copied and then physically transported to other sites. The facility is also useful for Model 15 terminals dedicated to stand alone use with T2SA2 or T2SA2I and having no on-line capability. A diskette containing T2SA2 or T2SA2I can be physically transported to the terminal system and locally loaded. Data captured on diskettes can be transported to another site for onward transmission to the mainframe. Hence the terminal system requires no on-line capability.

MAINFRAME SUPPORT OF 7502 — SECTION 10

This section identifies what mainframe support is currently available or under development to enable the TEs described in section 4 to be used. To avoid unnecessary repetition in the items listed below, the phrase "all on-line TEs" comprises:

T2Bx, T2C1, T2C5, T2C6, T2SA1, T2SA3, T2SA1I, T2SA3I, T2RBxx, T2IPxx, T2AP01, T2ASx, and T2U1. (Note: T2C1, T2C5 and T2C6 are referred to as T2Cx.)

It is important to recognise that the simple Stand Alone and Stand Alone with AP systems require certain mainframe facilities either directly or indirectly (for example via other 7502s).

The fundamental mainframe features necessary to support 7502 systems are communications handlers for 7181 Mode and/or XBM line control procedures and software for teleloading TEs. The support position on individual mainframes is described below. Where references are made to card reader data this will only be applicable to the Model 25 system, otherwise Model 15 operation is applicable. Mainframe support of Model 10 is only applicable with respect to T2Bx, T2C1 and T2C5.

1900 MPOE Systems (with or without GEORGE 2)

All online TEs can be connected via 7920/7930 Scanner-only Systems or 7903 Communications Processor through Communications Manager to user written applications programs at line speeds of up to 9600 bps (4800 bps for T2Bx). Support will only be via Communications Manager for Scanner-Only Systems. On 7903 Systems T2Bx can also be supported by 7900 Housekeeping (but note that 7900 Housekeeping is a Category 2 product).

T2Bx may be connected on the same line as other TEs at a maximum line speed of 4800 bps.

T2Bx, T2Cx and T2IPxx may be connected to MAXIMOP for interactive operation only (MAXIMOP does not provide list file facilities to remote line printers or hard copy printers).

T2RBxx and T2IPxx may be connected to the G2 RJE spooling program XKVB to handle line printer and card reader data.

T2ASx may be connected to the file transmission programs XTFI (input) and XTFO (output) for transmission of Reference Files and AP Libraries only. Spool Files of screen data will not be handled by XTFI and users must either write their own programs or use the Dataskil package TPL SPODE to handle spooled data files.

Teleloading/teledumping is handled by XTLD, XTLS and XTLW.

1900 GEORGE 3 Scanner-on systems

All online TEs can be connected via 7920/7930 Scanner-only systems through Communications Manager to user written applications programs at line speeds of up to 9600 bps (4800 bps for T2Bx). Support will only be via Communications Manager.

T2Bx may be connected on the same line as other TEs at a maximum line speed of 4800 bps.

T2Bx, T2Cx and T2IPxx may be connected through Communications Manager to VIDIMOP (XKL8) for interactive operation only. They cannot be connected directly to G3 VDUMOP.

T2Rxx and T2IPxx cannot be connected to the G3 RJE System.

T2ASx may be connected to XTFI and XTFO as for 1900 MPOE.

Teleloading/teledumping is handled by XTLD, XTLS and XTLW.

1900 GEORGE 3/4 7903 Message Buffering systems

All online TEs can be connected via 7903 Communications Processor through Communications Manager to user written applications programs at line speeds of up to 9600 bps (4800 bps for T2Bx). T2Bx can also be connected via 7903 through 7900 Housekeeping (but note that 7900 Housekeeping is a Category 2 product).

T2Bx may be connected on the same line as other TEs at a maximum line speed of 4800 bps.

T2Bx, T2Cx and T2IPxx may be connected directly to G2 VDUMOP. Listfiles to LPs may be done via T2IPxx and T2RBxx. Listfiles to HCPs may only be done via T2C5. As T2C5 foes not support a console VT, console output must be directed to the mainframe operator's console.

T2RBxx and T2IPxx may be connected directly to the G3/4 RJE system.

T2ASx may be connected to XTFI and XTFO as for 1900 MPOE.

Teleloading/teledumping is handled by XTLD, XTLS and XTLW through Communications Manager or XTLG directly under G3/4.

7904, 7905 and 7906 systems

T2Bx, T2C1, T2C5 and T2RBxx are fully supported where 7904, 7905 and 7906 are emulating a 7903. Other XBM online TEs are supported in principle but the connections have not been validated.

Teleload in response to an XBM request for teleload is fully supported. Teleload in response to a 7181 request for teleload is not supported but may be accomplished by user coding in 7905 and 7906.

1901T/1902T Integrated Video Coupler systems

Only T2Bx can be connected via the IVC, on either the local or remote sockets, at speeds of up to 4800 bps. User written applications programs must be written to use Small Systems Driver. Communications Manager does not support the IVC.

Teleloading/teledumping is handled with by Small Systems Driver within a user written applications program or by XTLR.

2903/2904 ETS2/MTS systems

All online TEs except T2C6 and T2IPxx will be connectable via the local or remote communications couplers at line speeds of up to 4800 bps. (But availability dates for T2Cx and T2AP01 are not yet known.)

Interactive TEs can only be connected via ETS2 (2903/2904) or MTS (2904 only) routines to user written application's programs.

Non-interactive TEs can only be connected to XJXV which handles all bulk data of an RJE, stand alone, or file transmission type.

Interactive and non-interactive operation can take place concurrently but not with the same 7502. Thus the mixed bulk and interactive T2IPxx cannot be supported.

7181 Mode interactive operation and XBM non-interactive operation can be supported at different times with the same 7502 without having to reload 2903/2904 Executive.

Teleload/teledump is handled by XTLM.

System 4 systems

All online TEs can be connected via MCCCU through CCP to a Communications User Program under Multijob or J at line speeds of up to 4800 bps.

T2Bx, T2Cx and T2IPxx may be connected to MCO for interactive operation but MCO cannot output to hard copy printers and line printers.

T2RBxx and T2IPxx cannot be connected to RDT Control and all CR and LP data must be handled by CUPs.

No specific system software other than CCP is provided to support other non-interactive TEs and CUPs must handle all record formats themselves.

Teleload/teledump is handled by AAGJ5597AOOP and AAGJ5598AOOP respectively under J and S/TELELD and S/TELEDU under multijob.

2900 VME/B systems

Only T2Bx and T2RBxx are initially connectable to VME/B systems. Connections may be made via CLC or CNP through which teleload/teledump can be done and 7903, 4, 5 and 6 through which teleload/teledump cannot be done.

The T2Bx Direct Output facility to HCPs is supported by KOMMFY but not by VME/B subsystems TP and MAC. However, a Dataskil package DASH enables Direct Output to be done.

2900 VME/K systems

Only T2Bx, T2C1, T2C5 and T2RBxx are initially connectable to VME/K systems. Connections may be made via CLC only and teleload/teledump is supported.

2960 DME systems

All online TEs can be connected to DME/1900 via 7903 and Communications Manager or to DME/System 4 via CLC and CCP as described in items '1900 MPOE Systems (with or without GEORGE 2)'; '1900 GEORGE 3/4 7903 Message Buffering Systems'; '7904, 7905 and 7906 Systems'; and 'System 4 Systems'.

2950 systems

T2Bx, T2C1, T2C5, T2SA1, T2SA3, T2SA1I, T2SA3I, T2RBxx and T2IPxx will be connectable to DME/1900 via SMLCC and Communications Manager as described in item 1, 1900 MPOE Systems (with or without GEORGE 2) for Scanner-only systems. These systems will later be replaced by Full XBM versions of TEs and Communications Manager.

T2Bx, T2C1, T2C5 and T2RBxx will be connectable to VME/K as described in item '2900 VME/K Systems'.

Interchangeability of TEs

It is possible to change the TE in any given 7502 at any time during the day. However, if a 7502 operating under the control of a TE using XBM line procedures (see section 13) is subsequently loaded with T2Bx then it will be necessary to change either the mainframe controlling software or alternatively to provide two channels on the communications controller, one configured for T2Bx operation and the other configured for TEs using XBM. The line from the terminal must be switched to the appropriate channel when the TE is changed. Switching facilities are available in two forms, either situated between the line and the modems (in which case they are provided by the local PTT Authority) or situated between the modem and the communications controller in the form of CCITT switches.

7503 ENHANCEMENTS — SECTION 11

Five further TEs have been added to the range for the 7503. These are denoted by T3Cx, where x may take the value 31, 32, 41, 42 or 5. XBM Procedures are used (see section 13).

T2Cx TEs enable a single 7503 terminal to support both interactive working (with VTs and HCPs) and bulk working (with card reader, paper tape reader and line printer) concurrently. Certain TEs additionally support a Magnetic Tape Cassette Unit for data spooling. Despooling of card data from magnetic tape cassette to the line and spooling of line printer data to magnetic cassette may be performed in an on-line mode using T3C1 or T3C42. Despooling of line printer data may be performed off-line using T3C5.

Screen validation, hard copy formatting and direct output facilities are also supported by certain TEs in the group. Direct output is as described for T2Cx in section 6.

The TEs will be distributed to users on magnetic cassette fully consolidated. The required one can thus be loaded directly in the 7503 store. A magnetic Tape Cassette Unit and a console device remain mandatory for loading purposes.

The 7503 T3Cx TEs operate at line speeds of up to 9600 bps (provided the necessary mainframe support is available, see below).

T3Cx systems may share a line with T3Bx systems at line speeds of up to 9600 bps. They may also share a line with any other terminals using 7181 or XBM line control procedures, but the maximum line speed that may be used is limited by the maximum line speed capable of the slowest terminal on that line.

T3Cx systems may not share a line with T3Ax systems. Note also the T3Ax systems are not supported at line speeds of 9600 bps.

It is essential that a mixed bulk and interactive system is properly sized on terms of line utilisation in order to ascertain the likely throughput of the system. ICL support staff should be consulted in order to carry out this function.

All four on-line TEs described below all support a line printer, a card reader and/or a paper tape reader, a 7506/01 or 7507/01 console device, up to eight VT-2000 and up to eight 7572s. The 7572 may be used for direct output under the control of a mainframe application program (see section 6) or for local hard copy. For the purpose of local hard copy, 7572 and VT-2000 units may be logically grouped such that any desired sharing of printers is possible.

T3C3 group

The T3C3 group provides the base for mixed bulk and interactive systems working on-line to a mainframe. No use is made of the magnetic cassette for data storage.

T3C31 MIXED BULK AND INTERACTIVE SYSTEM

T3C31 provides facilities for a mixed bulk and interactive system working on-line to a mainframe and supports those devices identified above.

The store required is 40K bytes.

T3C32 MIXED BULK AND INTERACTIVE SYSTEM WITH SCREEN VALIDATION AND HARD COPY FORMATTING

T3C32 provided all the facilities of T3C31 and in addition supports screen validation and hard copy formatting.

The store required is 48K bytes.

T3C4 group

The T3C4 group provides the base for mixed bulk and interactive systems working on-line to a mainframe and additionally provide for data use of magnetic cassettes for bulk data spooling.

T3C41 MIXED BULK AND INTERACTIVE SYSTEM WITH SPOOLING

T3C41 provides facilities for a mixed bulk and interactive system working on-line to a mainframe. In addition to the devices identified above, it also supports a single or twin Magnetic Tape Cassette Unit.

The Magnetic Tape Cassette Unit may be used for bulk data spooling of line or paper data output from the mainframe or for bulk data despooling of card or paper tape data (previously spooled onto the magnetic cassette) to the mainframe.

The spooling of cards or paper tape data onto magnetic cassette for use by this TE is achieved by the use of T3A6 (for cards and paper tapes) or T3A4 (for card data only).

The store required is 48K bytes.

T3C42 MIXED BULK AND INTERACTIVE SYSTEM WITH SPOOLING, SCREEN VALIDATION AND HARD COPY FORMATTING

T3C42 provides all the facilities of T3C41 and in addition supports screen validation and hard copy formatting.

The store required is 56K bytes.

T3C5

T3C5 provides the facility for despooling line printer data, previously spooled on to magnetic cassette under the control of a T3C4 group TE.

T3C5 supports a line printer, a 7506/01 or 7507/01 console device and a single or twin Magnetic Tape Cassette Unit.

The store required is 24K bytes.

Dire output

The direct output facility of T3Cx is functionally similar to the direct output facility of T3Bx but, in the case of T3Cx, the HCP is driven by the mainframe applications program in the same manner as a line printer. Full details of the control from the mainframe of an HCP in this mode are as described earlier for 7502 in section 6.

Note that the direct output facility is intended for low volume intermittent printing (such as that which is often required in transaction processing applications, where the processing of a transaction involves the printing of a small volume of data, often just a single form) and is not suitable for continuous output of the type that occurs in batch processing.

Within a single 7503 configuration it is possible for some HCP units to be used for direct output whilst others may be used for local hard copy. However, once an HCP is selected for direct output (by operator action at the remote 7503), it is not available for local hard copy printing until specifically freed from the direct output.

The T3Cx direct output facility is not compatible with the direct output facility of T3Bx.

7503 store extensions for T3Cx

As can be seen from the above descriptions, certain T3Cx TEs require 7503 storage in excess of 32K bytes.

To accommodate these programs store size may be extended up to a maximum of 64K bytes by using additional 8K bytes store modules. (Note that to accommodate additional store over 32K bytes a store extension panel is required. It is also probable that existing single cabinet 7503 systems will require an extension cabinet plus some rearrangement of store boards and peripheral couplers.)

MAINFRAME SUPPORT OF 7503 T3Cx SYSTEMS

SECTION 12

General support conditions

T3Cx systems are supported only by mainframes that support XBM line control procedures. The support position on individual mainframes is described below.

1900 MPOE systems (with or without GEORGE 2)

T3Cx systems can be connected via a 7920 or 7930 scanner-only system or a 7903 Communications Processor. Support is provided by Communications Manager. Line speeds of up to 9600 bps are supported.

The GEORGE 2 RJE spooling utility #XKVB may be used in conjunction with Communications Manager to support the bulk peripherals attached to a T3Cx system.

1900 GEORGE 3 scanner-only systems

T3Cx systems can be connected via a 7920 or 7930 scanner-only system. Support is provided by Communications Manager. System use (RJE) of the bulk peripherals connected to the T3Cx system is not supported. Vidimop is available via Communications Manager. Line speeds up to 9600 bps are supported.

1900 GEORGE 3/4 7903 systems

T3Cx systems can be connected via 7903 systems. RJE system use of the bulk peripherals connected to the T3Cx system is supported. Vidimop and VDU MOP are both supported. Line speeds up to 9600 bps are supported.

Note: T3Cx systems are not supported by 7901 message buffering systems.

1901T/2T systems

T3Cx systems cannot be connected to 1901T/2T systems via the Integrated VDU coupler. However, connection can be effected as for other 1900 Systems as described above.

2903

T3Cx systems cannot be connected to 2903.

System 4

T3Cx systems can be connected via MCCCU to System 4 machines with CCP running under Multijob or J. Line speeds up to 4800 bit/s are supported.

System use of Bulk Peripherals (RDT Control) is not supported for T3Cx.

7905 systems

T3Cx systems will be supported by 7905 but will normally require the adding of user-written code either in the 7905 or the associated mainframe. Line speeds up to 9600 bps are supported.

Use of T3Cx systems with existing applications programs

Existing applications programs will have been written to support either T3Bx interactive video systems or T3Ax bulk systems. When converted for use on T3Cx systems these programs may be used with a single 7503 supporting both bulk and interactive devices, or with separate 7503 terminal systems with bulk and interactive devices, but using XBM procedures.

Particular attention must be paid to the following aspects of applications programming:

1 Direct control of bulk devices

2 System use of bulk devices

3 Direct control of interactive devices

4 System use of interactive devices

5 Use of the direct print facility

The following constraints apply to the use of T3Cx facilities, providing the connectivity rules above are adhered to.

1900 MPOE SYSTEMS

All applications programs written to directly control bulk devices using Communications Manager and T3Ax systems will work unchanged with the same bulk devices connected to T3Cx systems.

#XKVB will support bulk devices connected to T3Cx systems.

All applications programs written to directly control interactive devices, for T2Bx and T3Bx systems will work unchanged with the same interactive devices connected to T3Cx systems.

All applications written to use the direct output facility to T3Bx systems will require modification in order to use the direct output facility of T3Cx systems.

1900 GEORGE 3 SCANNER-ONLY SYSTEMS

All applications programs written to directly control bulk devices using Communications Manager and T3Ax systems will work unchanged with the same bulk devices connected to T3Cx systems.

Bulk devices attached to T3Cx systems may not be used for RJE. All applications programs written to directly control interactive devices for T2Bx and T3Bx systems will work unchanged with the same interactive devices connected to T3Cx systems. Interactive devices connected to T3Cx systems may only be attached to Vidimop via Communications Manager.

Applications programs written to use the direct output facility to T3Bx systems will require modification in order to use the direct output facility of T3Cx systems.

1900 GEORGE 3/4 7903 systems

All applications programs written to directly control bulk devices connected via 7903 will work unchanged with the same devices connected to T3Cx systems.

Bulk devices attached to T3Cx systems may be used for RJE.

All applications programs written to directly control interactive devices attached to T2Bx and T3Bx systems will work unchanged with the same interactive devices connected to T3Cx systems.

Interactive devices attached to T3Cx systems may use Vidimop or built-in VDU mop.

Applications programs written to use the direct output facility of T3Bx systems will require modification in order to use the direct output facility of T3Cx systems.

System 4

Communications User Programs (CUPs) written to directly control bulk devices attached to T3Ax systems will require modification in order to work with the same bulk devices connected to T3Cx systems.

CUPs written to directly control interactive devices attached to T3Bx systems will require modification in order to use the direct output facility of T3Cx.

Systems use (multi-access) of the interactive devices connected to T3Cx systems under Multijob is not possible, nor is system use of the Bulk Peripherals (RDT Control) possible.

7905

T3Cx systems are not catered for by 7905 system software (for example, Turnkey Systems) but Line Service Routines (LSRs) are available to handle XBM line control procedures. User own-coding will be required in the 7905 in order to interface with these LSRs.

XBM LINE CONTROL PROCEDURES — SECTION 13

XBM line control procedures have been introduced by ICL to provide a communications protocol capable of handling different types of communications devices on the same line. These procedures, which conform to ISO recommendations for Basic Mode procedures, are an extension of ICL's existing Basic Mode procedures used for 7181/2 video systems and for 7502 T2Bx and 7503 T3Bx environments.

Until now, configurations for bulk input/output have used a different, incompatible, line protocol developed initially for 7020 Remote Data Terminals and subsequently implemented for 7503 T3Ax environments.

XBM procedures allow both bulk and interactive traffice to co-exist on a single communications line. In addition, XBM procedures allow bulk and interactive traffic to originate from a single terminal configuration (as, for example, with the new 7503 T3Cx TEs.

XBM procedures are used by the following TEs.

1 7502 T2C1, T2C5, T2C6, T2SA1, T2SA3, T2A1I, T2SA3I, T2RBxx, T2IPxx, T2AP01, T2AS4, and T2AS5 series of TEs

2 7503 T3Cx series of TEs

7181/2 and 7020 procedures are still used in T2Bx/T3Bx and T3Ax environments, respectively, and their use may still show advantages, in terms of performance and compatibility with existing applications, depending on the particular configuration and application.

The overall performance requirements of a system using a single line for mixed bulk and interactive traffic must be studied carefully in order to determine whether the system is capable of satisfying the requirements for bulk throughput and interactive response time. Reference should be made to ICL support staff in order to establish the viability of a proposed configuration and system.

A1.1 7502 Model 10 INTERACTIVE TERMINAL SYSTEM - BASIC

7502/05 Modular Terminal System with 12K bytes of store, Line Unit at 600, 1200, 2400, 4800 and 9600 bps, and Terminal Cascade Facility (TCF)
7595/01 Housing Unit
F2068/00 Blanking Panel

One of the following combinations of Video Terminals and couplers:

7561/02 Video Terminal and keyboard with English SCR
F2042/01 Coupler for 2 x 7561/02 (VT-2000)

7561/02 Video Terminal and keyboard with English SCR
F2042/02 Coupler for 4 x 7561/02 (VT-960)

A1.2 CONVERSION OF 7502 MODEL 10 TO 7502 MODEL 15

Conversion is only possible if the Model 10 has 16K bytes of store, not greater than six VTs connected and at least one VT is fitted with a F1779/00 PID reader.

Three conversions are possible dependent on the type of VT in use:

C1695/00 for 7561/01 VT-2000 systems
C1709/00 for 7561/02 VT-2000 systems
C1710/00 for 7561/02 VT-960 systems

The conversion kit comprises:

7551/14 Dual Floppy Disc Drive and coupler
F1779/25 Pack of five console PIDs

The Dual Floppy Disc Drive goes in the 7595/01 Housing Unit and the F2068/00 Blanking Panel is removed.

A1.3 7502 MODEL 15 INTERACTIVE/STAND ALONE TERMINAL SYSTEM - BASIC

7502/05 Modular Terminal System with 12K bytes of store, Line Unit at 600, 1200, 2400, 4800 and 9600 bps, and Terminal Cascade Facility (TCF)
7512/00 Additional 4K bytes store
F1779/00 Personal Identification Device (PID) reader
F1779/25 Pack of five console PIDs

One of the following combinations of Video Terminals and couplers:

7561/02 Video Terminal and keyboard with English SCR
F2042/01 Coupler for 2 x 7561/02 (VT-2000)
7561/02 Video Terminal and keyboard with English SCR
F2042/02 Coupler for 4 x 7561/02 (VT-960)
7551/12 Dual Floppy Disc Drive (including Coupler and Housing Unit)

A1.4 ADDITIONAL 7502 EQUIPMENT

The following additional equipment is associated with enhancements to the basic systems:

7512/00 Additional 4K bytes of store for Model 10
7512/03 Additional 12K bytes of store for Model 15 (maximum two)

F1931/00 Connector for UK PO Modem No 1,7B, or 7C
F1932/00 Connector for Approved OEM Modems
F1933/00 Connector for TRT Sematrans Modems 1203, 2401, 4801

F2093/03 Print Band 64 characters English SCR for 7520/11 and 7521/11
F2093/04 Print Band 64 characters Swedish SCR for 7520/11 and 7521/11
F2093/05 Print Band 64 characters Danish SCR for 7520/11 and 7521/11
F2055/00 Print Repertoire, English SCR for 7525/02
F2056/00 Print Repertoire, Swedish SCR for 7525/02
F2057/00 Print Repertoire, Danish SCR for 7525/02
F2058/00 Non-standard print repertoire for 7525/02 (with one non-standard character and/or any rearrangement of a 64 character set)

} Not applicable to Model 10

F2059/00 Additional non-standard print repertoire for 7525/02 } Not applicable
F2060/00 Spare non-standard print barrel (required when F2058 } to Model 10
is specified)

F2124/00 Terminal Cascade Connector

7551/16 Second Dual Floppy Disc Drive (including Housing Unit)

One of the following printers: } Not applicable to Model 10

7520/11 Line Printer 300 lpm (including coupler)
7521/11 Line Printer 600 lpm (including coupler)
7525/02 Line Printer 300 lpm, 132 print positions (including coupler)

7561/02 Video Terminal and keyboard with English SCR

F1936/00 Coupler for 1st, 2nd or 4th pair of 7561/01
F1976/00 Coupler for 3rd pair of 7561/01

F2042/01 Coupler for 2 x 7561/02 (VT-2000)
F2042/02 Coupler for 4 x 7561/02 (VT-960)

F2043/00 Input/Output Module

F1776/00 Swedish SCR on 7561 (1900, S4, 2903 and 2900 Series)
F1777/00 Danish SCR on 7561 (1900, S4, 2903 and 2900 Series)

F1779/00 PID reader
F1779/15 Pack of ten PIDs
F1779/25 Pack of five console PIDs } Not applicable
F1779/35 Pack of five Application Development PIDs } to Model 10

7574/10 } Hard Copy Printer English SCR
7574/11 }
7574/12 } Hard Copy Printer Danish SCR
7574/13 }

7574/14 } Hard Copy Printer Swedish SCR
7574/15 }

7576/10 Hard Copy Printer English SCR
7576/12 Hard Copy Printer Danish SCR
7576/14 Hard Copy Printer Swedish SCR
7576/16 Hard Copy Printer Standard Arabic SCR
7576/18 Hard Copy Printer Arabic Version 'L' SCR
7576/22 Hard Copy Printer Arabic Version 'K' SCR

Publications notice

Technical Publication no.	Title (Notice no.)	Date
4802	7500 System (9)	3/1/79

T2AP01 RELEASE 200

The following amendments and additions should be made to Publications Notice 4 to the manual in order to cater for Release 200 of T2AP01 terminal executive and changes to T2C6 terminal executive. The information in Publications Notice 4 and this notice refer to the current release of T2C6. There are to be no further releases of T2C6.

SUMMARY OF ENHANCEMENTS SECTION 1

Amend line 5 to read:

"output and one or two dual floppy disc drives are required to hold the"

Amend lines 13, 14, 15 (the last sentence) to read:

".... ..T2AP01 and T2C6 also allow hard copy printers to be used for direct output from the mainframe. This Direct Print facility runs independently of the VTs. It permits output of one or more messages of data from the mainframe to a specified hard copy printer. Direct Print competes for use of the hard copy printer with both the functions of local print (via PRINT key) and the TPL PRINT verbs."

T2AP01 AND T2C6 FACILITIES SECTION 2

Add to the third paragraph (T2C6 provides a sub-set .....): "The CONTINUE command permits TPL processing to be resumed after a SEND verb. The END PATH command accesses the Path Catalogue facility."

Basic Mode and Application Mode

Delete the second paragraph (In Basic Mode both ....) and substitute:

"In Basic Mode both terminal executives will behave like a T2C5 terminal executive (see Publications Notice 2 of the manual) except for the following restrictions:

1 Print formatting facilities are not available

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2 SEND validation is not supported. Operationally the lack of SEND validation forces TAB to be used on the last field entered if validation on it is required

3 The validation codes supported are limited to 4/0 to 4/14. That is there is no support for validation codes containing accumulator functions (code 4/15 to 5/4, refer to section 5.2.1.1).

4 Input fields cannot be defined as flashing or blanked. The option of special underline and suppression of validation error messages are not available in AP mode

5 Only 4 videos can be supported, not 8 as in T2C5 terminal executive

The limitations of items 1 to 4 can be removed in T2AP01 by using TPL as a natural alternative, T2C6 however offers no alternative method.

Amend line 19 of page 4 to read:

"in *7502 Operating*, TP 4804, Publications Notice 5"

Amend the first line of the last paragraph of section 2 to read:

"For T2AP01 and T2C6, regardless of the mode of operation of the video".

T2AP01 AND T2C6 BASIC MODE MESSAGE FORMATS, COMMANDS AND RESPONSES — SECTION 3

Output message format in Basic Mode

Insert the following as a second sentence in the first paragraph:

"Note that the use of SYN characters referred to in sections 5.1.3.1, 5.1.3.2 and 5.1.3.3 is not required."

T2AP01 AND T2C6 APPLICATION MODE MESSAGE FORMATS, COMMANDS AND RESPONSES — SECTION 4

Insert the following sentence at the end of the first paragraph:

"Up to 79 characters can be displayed, any further data being ignored"

Amend in the second paragraph the sentence "These will have ... of the manual" to read:

"Set Receive is illustrated in Example 2 on page 18 of this notice. Alarm is defined in section 5.1.3.6 of the manual"

Add the following statement at the bottom of page 6:

"When an ESC is found in the message the next character is checked to see if it corresponds to one of the commands (3/1, 4/6 - 4/15) and if so checks are then made to find the required parameters. This may result in an error being detected and an Error Response generated. If it does not, the command is implemented and another ESC sequence searched for. If the ESC is not followed by a valid command identifier then the character is displayed on the last line (but not the preceding ESC). If ESC is followed by ESC then a 'B' character will be displayed. A search will then be made for the next ESC sequence'.

Application Mode Commands

Amend the first sentece of the definition *nn* to read:

"*nn* is a format number within the path in the range 00 to 99 encoded"

Application mode diagrams

Delete the heading 'Application mode diagrams' and replace with 'ACTION MESSAGES'

Insert the heading 'Application mode diagrams' before line 19 on page 15 ('A conceptual diagram showing.....)

7500 7500

Publications notice

ICL

Technical Publication no.	Title (Notice no.)	Date
4802	7500 System (10)	3/1/79

7520/11 AND7521/11 LINE PRINTERS AND ASSOCIATED TERMINAL EXECUTIVES

This Publications Notice introduces the 7520/11 and 7521/11 line printers and the two Terminal Executives, T2IP11 and T2RB11, associated with them.

Terminal Executive T2RB11

T2RB11 is used with the 7502 Model 20 remote printing system and with the 7502 Model 25 remote batch system. These systems are fully described in the Restricted Publications *7502 Planning and Implementation: Remote Printing and Remote Batch Systems* (RP1012) and *7502 Operating: Remote Printing and Remote Batch Systems* (RP1013).

Terminal Executive T2IP11

T2IP11 allows remote printing but also supports up to 6 VT2000 or 8 VT960 video terminals for interactive work at the same time.

T2IP11 provides identical facilities to T2IP01 described in Publications Notice 3 but controls the 7520 or 7521 line printer instead of the 7525 line printer.

It should be noted, however, that the sections on *Line printer data* and *Controlling paper movement* describe 1900, 2903/4 and System 4 mainframes only. For 2900 mainframes which use a different method of control a more adequate explanation can found in the Restricted Publications mentioned above, T2RB11 and T2IP11 being identical in their methods of line printer control.

7520/11 and 7521/11 Line Printers

The 7520 and 7521 are free standing and compact line-at-a-time printers which use time shared hammer technology to achieve 132 print positions with 33 or 66 hammers respectively. The printing function is achieved by the action of the print hammers compressing the paper and an inked ribbon against a horizontally moving steel print band engraved with the character set.

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Many of the functions of the 7520 and 7521 have been automated, for example, printing format is under software control thereby eliminating the need for paper tape format loops. The 7520 and 7521 are provided with a coupler for connection to the 7502 Modular Terminal Processor and will normally be sited adjacent to it.

The 7520 and 7521 have the following characteristics:

Printing speed	
7520	300 lines per minute
7521	600 lines per minute
Print positions	132
Repertoire	64
Type font	ECMA 11 OCR-B Size 1 (Second edition)
Character pitch	10 characters per inch
Line pitch	6 or 8 lines per inch under operator control
Format control	via software
Throwing speed	20 inches per second
Stationery dimensions	Width : Min 102mm (4.0 inches) Max 425 mm (16.75 inches) Length: Min 203mm (8.0 inches) (between folds) Max 356 (14.0 inches)
Stationery type	Single or multipart (up to 6 parts)
Ribbon	Heavy nylon
Hopper capacity	305 mm (12.0 inches) with cabinet door closed
Stacker capacity	127mm (5.0 inches) high

Publications notice

Technical Publication no.	Title (Notice no.)	Date
4802	7500 System (11)	12/1/79

7501 MODULAR TERMINAL SYSTEM

This Publications Notice describes the 7501 terminal systems recently introduced into the 7500 Range of Modular Terminal Systems.

The 7501 is an integral part of the 7500 Range and as such, complements the 7502 by providing many of the facilities of the 7502 within a new series of systems. At the lower end the 7501 is a single compact unit with a video display for use as an interactive device. At the upper end an extra video display and the addition of floppy disc facilities allow full interactive, stand-alone and TPL Application programming facilities. However, unlike 7502, 7501 does not provide remote batch or remote printing facilities.

Functionally 7501, though more limited in connectivity, is largely similar to 7502. There is however one significant enhancement in comparison with 7502 systems which use 7502/05Modular Terminals Processor, (MTP) in that a larger read-only-memory (ROM) program has been included in 7501 in order to improve teleloading and teledumping facilities and to provide Full XBM line control procedures.(The more recent 7502/06 MTP also has the enhanced ROM - see the Publications Notice entitled *Full* XBM *Terminal Executives*). This notice describes the ennanced facilities, gives systems information where this is different from 7502, and provides references to other 7500 literature as appropriate.

Operating instructions for 7501 are given in a Publications Notice to *7502 Operating* TP4804

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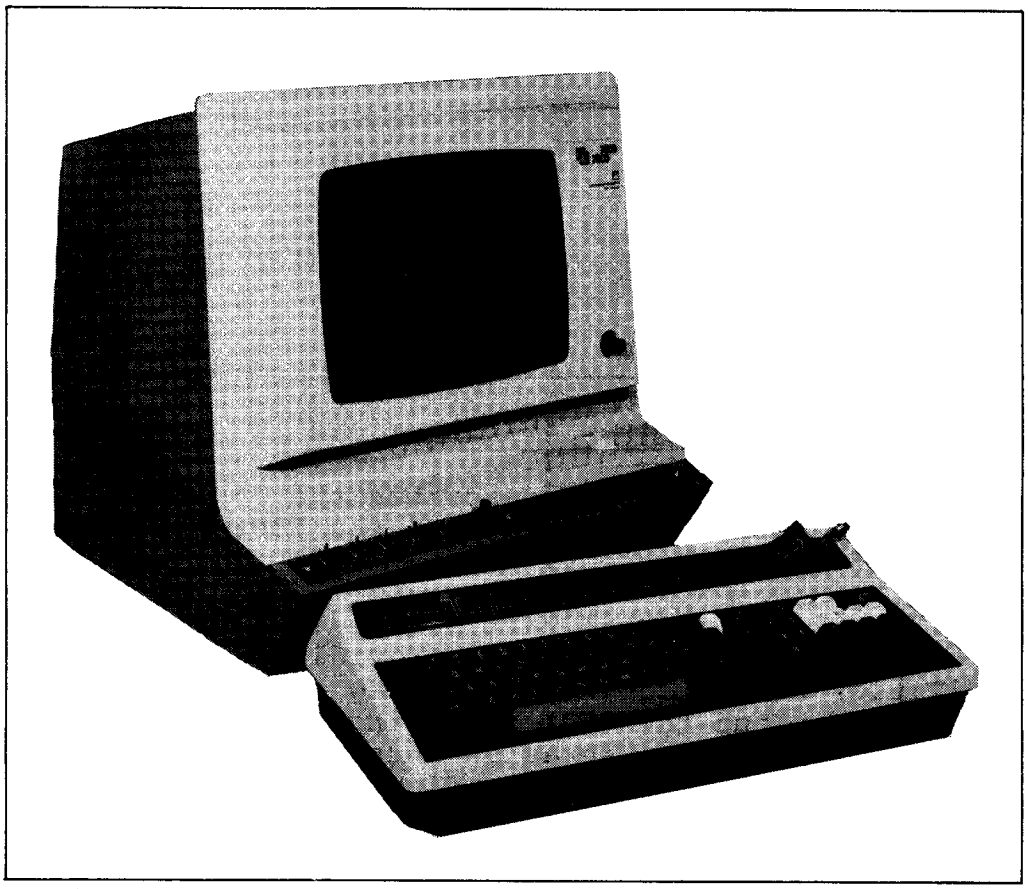

Figure 1 7501/01 Modular Terminal Processor

GENERAL SECTION 1

There are four 7501 systems as follows

1 7501 Model 10 20kb Single VT interactive system

2 7501 Model 10 20kb two VT interactive system

3 7501 Model 15 40kb Single VT interactive/ Stand alone system

4 7501 Model 15 40kb two VT interactive/stand alone system

The major component of all the systems is the 7501/01 Modular Terminal Processor with built-in video display and associated keyboard. This is a complete unit in itself and forms the first system in the range. It is shown in figure 1.

To this basic system can be added a further video display and keyboard in the form of a 7561/02. This provides the second system in the range.

The third system in the range is provided by increasing the store size and attaching a Dual

Floppy Disc Drive to provide a single display system on which the full benefits of stand-alone and TPL applications programming become available.

The largest system in the range provides all the facilities of the third system but with a second display provided by a 7561/02 video terminal.

To any of these systems can be added, as optional extras, up to two 7572, 7574 or 7576 Hard Copy Printers. A second 7551 Dual Floppy Disc Drive is also available, optionally, for connection to either of the Model 15 systems thus making it possible to have a total of one megabyte of disc store available at a time.

As for 7502 line speeds of up to 9600 bits per second are achievable via approved PTT or classified OEM modems or direct connection.

7501/01 MODULAR TERMINAL PROCESSOR SECTION 2

The 7501/01, illustrated in figure 1, is a complete single-screen system in itself. Within the 7501 cabinet is housed a logic rack, power supplies and integral video display. The logic rack has a minimum set of four printed circuit boards on which are contained the processor, 20K bytes of RAM store, 4K bytes of ROM store and various couplers and control circuits. There are two additional positions for boards, one of which is used to provide a coupler for a second video display or an extra 20K bytes of store or both. The other position provides a coupler for one or two Dual Floppy Disc Drives.

The 7501/01 has a 12-position rotary switch situated beneath the video screen. This switch provides similar, though enhanced, facilities to those provided by the 16-position rotary switch on the 7502/05 MTP. Like the 7502 the 7501 has a genres/activate switch, for initiating the functions selected by the rotary switch, and modem control switches, error lamps and a fault lamp all with similar functions to those on the 7502. There are eight rear panel switches and internal hardware switches some of which have minor differences to those on 7502 (as described below)

Apart from the integral display the 7501/01 is functionally similar to the 7502 MTP. However, as mentioned above, compared with the 7502/05 a significant enhancement to the teleloading and teledumping facilities has been made by the inclusion of a larger read-only-memory. This new built-in program allows operator selection of both the line control procedures and the terminal executive for teleloading without first having to load T2U1.

The required TE can be selected from a library at the mainframe of up to twenty TEs.

The significance of the various switch positions on the 7501 is shown below

Rotary switch

position	*function*
0	Engineer or 7502/03 emulation
1	Loopback modem test
2	Restart
3	Local load
4	Operator selected teleload request
5	7181 teleload request
6	XBM teleload request
7	Full XBM teleload request
8	Local dump
9	7181 teledump request
10	XBM teledump request
11	Full XBM teledump request

Rear panel switches

2^0	TE entry control
2^1	unused
2^2	)
2^3	) Base address ÷ 4
2^4	)
2^5	)
2^6	)
2^7	Teleload buffer location

Teleloading

As can be seen from the rotary switch positions there are four positions concerned with teleloading. Positions 5, 6 and 7, when activated cause a request message to be sent to the mainframe in the selected line control procedure. The code sent is 4/8, 4/1 in each case and this will request a predetermined TE in a manner similar to 7502.

In position 4 of the rotary switch the operator is invited, by a message on the display, to type in a

TE identifier (a letter in the range A to T) and a line control procedure identifier (a number in the range 1 to 3). The PROM then generates a TE request message in accordance with the identifiers typed in as follows

TE identifier A produces the code 4/8, 4/0
TE identifier B produces the code 4/8, 4/1
TE identifier C produces the code 4/8, 4/2
and so on to
TE identifier J which produces the code 4/8, 4/9
TE identifier K produces the code 4/9, 4/0
TE identifier L produces the code 4/9, 4/1
TE identifier M produces the code 4/9, 4/2
and so on to
TE identifier T which produces the code 4/9, 4/9

Procedure identifier 1 produces 7181
Procedure identifier 2 produces XBM
Procedure identifier 3 produces Full XBM

Thus the operator is provided with the means of selecting a particular TE from a library of twenty TE's at the mainframe and of teleloading the TE to the terminal in the line control procedure appropriate to mainframe requirements. Users should ensure that the relationship between TE identifiers and the actual TE's held at the mainframe is known by all terminal users.

PREVENTING ENTRY OF A TELELOADED TE

If it is desired to dump a teleloaded TE to diskette it is necessary to prevent it being entered after it is teleloaded. This is achieved, in the same way as on 7502/05, by setting the rotary switch to position 2 (Restart) before the teleload has completed. However, on the 7501 (and 7502/06) there is an additional method of preventing the TE being entered. This method is to set the 2^0 switch on the rear panel to 1 before activating the teleload. Where a floppy disc drive is in use for local loading the switch should be left in position 1 all the time as teleloading will merely be the means of creating the diskette library. This technique cannot be used when teleloading T2B5.

Teledumping

The 7501/01 has three rotary switch positions concerned with teledumping. Positions 9, 10 and 11, when activated all cause a message 4/8, 4/10 to be sent to the mainframe advising that it is required to transmit the contents of the MTP store to the mainframe. The rotary switch position is chosen according to mainframe line control procedure requirements.

7502/03 Emulation

Like the 7502/05 MTP, the 7501/01 can be set up to respond to the mainframe's polling in a manner compatible with 7502/03, that is, to generate a teleload request when switched on. However, with 7501 (and 7502/06) extra flexibility is provided and internal hardware switches can be set up to make the MTP respond automatically in any of three line control procedures (7181, XBM or Full XBM) or to make it not respond automatically but to wait for operator input.

Video display and keyboard

The integral video display and keyboard have the same characterists as the 7561/02 video terminal already introduced into 7502 systems. These video displays in conjunction with their coupler, have the following enhancements in comparison with the earlier 7561/01 video terminal.

1 They can be set up by an internal hardware switch at installation time, to have a 2000 character screen (VT2000) or a 960 character screen (VT960). The VT2000 has 25 lines of 80 characters each and the VT960 uses 12 alternate lines of 80 characters each. A mixture of VT2000 and VT960 screens on the same 7501 system is not permitted.

2 They provide improved character definition by using a 12 x 7 dot matrix symbol generator.

3 Half brightness for protected data is provided in lieu of italics.

4 They have an optional flashing cursor. The cursor is displayed in flashing mode unless the character it is aligned with is itself flashing.

The keyboard is supplied as standard with key tops in the English Standard Character Repertoire. Danish and Swedish variants to the key tops are available by specifying features F1777/00 and F1776/00 respectively. Differences in code sets for foreign languages are catered for in the TE.

The keyboard is detachable and can be situated up to two metres away from the MTP.

Connection to 7502

The 7501/01 Modular Terminal Processor with its integral screen and keyboard can be connected to a 7502 system to act as an ordinary video terminal.

7501 systems may be connected to the terminal cascade facility of a 7502 system but the 7501 does not itself have this facility.

7561/02 video terminal and keyboard

A 7561/02 video terminal may be connected to the 7501 to provide a second video display and keyboard. The 7561/02, which has already been introduced into 7502 systems, can be sited up to 1000 metres cable length away from the parent 7501/01. The earlier 7561/01 video terminal cannot be connected to the 7501.

The characteristics of the 7561/02 are as described for the integral display and keyboard in Section 1.

Hard copy printers

7501 systems can optionally support up to two hard copy printers (HCP). The HCPs can be any mix of the 7574, 7576 or the earlier 7572. The 7676 can be sited up to 150 metres cable distance from the 7501/01 and the 7574 and 7572 are capable of being sited at up to 1000 metres away. All the printers are table top models: their characteristics and some systems considerations are given below

7572 HARD COPY PRINTER (HCP 60)

Print speed	60 characters per second
Print positions	118
Character pitch	10 per inch
Line spacing	6 lines per inch
Character repertoire	English, Swedish and Danish
Paper feed	Fixed
Paper	Rolls of 3.5" diameter. Single sheets of width 12.85 inches (326mm) and form depth of 3.67 inches (93mm), 5.5 inches (140mm) or 11 inches (279mm). Fanfold of 12.85 inches.
Copies	Original plus five copies.

7574 HARD COPY PRINTER (HCP 45)

Print speed	Up to 60 characters per second
Print positions	132
Character pitch	10 per inch
Line spacing	6 lines per inch for 7574/10 8 lines per inch for 7574/11
Character repertoire	English, Danish and Swedish (96 characters)
Character formation	7 x 7 dot matrix
Paper feed	Adjustable tractor
Paper	Minimum width: 4 inches, maximum 15.35 inches
Copies	Original plus four copies
Dimensions	Height 333mm Length 690mm Depth 516mm
Printer weight	30Kg

The 7574 offers additional facilities over the 7572. For example, 132 print positions and adjustable feed tractors.
However, consideration in the use of these features has to be taken account of in the users mainframe application programs. There are two versions of this HCP, the 7574/10 and the 7574/11. The earlier versions (7574/10) are not fitted with a Vertical Format Unit for control of paper feeding other than New line. Thus on the 7574/10 there are no Form Feed or Vertical Tab facilities and the reception of a Form Feed or Vertical Tab will, in this case, result in a single line feed. Consideration must be given to these characteristics in the users mainframe application program by providing multiple line feeds and multiple space characters.

7576 HARD COPY PRINTER

Print speed	180 characters per second
Print positions	132
Character pitch	10 per inch
Line spacing	6 lines per inch or 8 lines per inch
Character repertoires	English, Danish, Swedish and Arabic (96 characters)
Character formation	7 x 7 dot matrix
Paper feed	Adjustable tractor
Paper	Width: Minimum 4 inches maximum 16.75 inches Length: minimum 3.5 inches maximum 17 (12 inches if using stacker)

Copies	Original plus four copies.
Dimensions	Height 368mm Length 711mm Depth 445mm
Weight	44.5Kg (approx).

The 7576 has paper control facilities (Form Feed and Vertical Tab) which are compatible with the 7572 and in addition offers significant improved facilities in terms of printing speeds and paper widths. Printing is bi-directional with the printing head travelling in each direction only as far as necessary to print the characters of each line.
Full operating procedures for the 7572, 7574 and 7576 HCPs are given in *Operating 7500 Range Video Terminals* TP4803

Dual floppy disc drive

Up to two 7551 Floppy Disc Drives (FDD) can be connected to the 7501 to make it possible to have a total disc storage capacity of one megabyte available at a time. At least one FDD is required if it is intended to perform stand-alone working or to make use of the Terminal Programming Language (TPL). A housing unit to take two Dual Floppy Disc Drives is supplied with all Model 15 systems. If only one Dual Floppy Disc Drive is required the space for the second Drive is covered by a blanking panel.

Brief characteristics of each Floppy Disc Drive are given below

Format	Will conform to ECMA
Number of tracks	77 (74 useable plus 3 reserves).
Sectors per track	26
Bytes per sector	128
Recording capacity	256K bytes (243K bytes available for data).
Transfer rate	39K bytes per second (approx).
Minimum seek time	20 ms (one track)
Maximum seek time	730 ms (based on 72 tracks)
Average access time	350 ms (including time to re-load after a period of inactivity)

TERMINAL EXECUTIVES — SECTION 4

All 7502 TEs are potentially capable of operating in a 7501. However, in practice, the actual TEs that can be used with each 7501 system are determined by the limitations on peripheral connectivity, the amount of

store fitted, whether or not floppy disc facilities are provided and the content of TE sets. Also, the line control procedures in use by the mainframe must, of course, be compatible with that used by the TE.

The following table gives a complete list of TEs that can be used with 7501 together with the 7501 systems they can be used on. TPL applications written for 7502 systems can be run on 7501 Model 15 systems.

TE	*Store size (bytes)*	*Diskette*	*TPL used*	*on-line off-line*	*line control proc-edures*	*7501 system*
T2B5	16K	No	No	on-line	7181	All
T2C5	16K	No	No	on-line	XBM	All
T2SA1I	16K	Yes	No	on-line	XBM	Model 15
T2SA2I	16K	Yes	No	off-line	-	Model 15
T2SA3I	16K	Yes	No	on-line	XBM	Model 15
T2AP01	40K	Yes	Yes	on-line	XBM	Model 15
T2AP11	28/40K	Yes	Yes	off-line	-	Model 15
T2AP12	40K	Yes	Yes	off-line	-	Model 15
T2AS4	28K	Yes	No	on-line	XBM	Model 15
T2AS5	28K	Yes	No	on-line	XBM	Model 15
T2UxI	16K	Yes	No	off-line	-	Model 15
G2C5	28K	No	No	on-line	Full XBM	Model 15
G1C4	20K	No	No	on-line	Full XBM	All
G2SA1	28K	Yes	No	on-line	Full XBM	Model 15
G2SA3	28K	Yes	No	on-line	Full XBM	Model 15

Full descriptions and operating procedures for these TEs are given in other publication notices to this manual, in *7502 Operating* TP4804, and in *TPL Application Programming* TP4809. Complete

details of TPL are given in TP4809.

MAINFRAME SUPPORT — SECTION 5

The mainframe cannot distinguish between a 7501 system and a 7502 system as the software is the same for both. It follows that mainframe applications already implemented for 7502 systems would require no change to operate with similar 7501 systems.

Information on mainframe support capability is identical for both 7501 and 7502 and is given in other publications notices to this manual.

PHYSICAL AND ENVIRONMENTAL DETAILS — SECTION 6

Installed dimensions

Height	510mm
Width	500mm
Depth	710mm (including keyboard)

Access clearance required

Front	900mm
Rear	900mm
Left	100mm

Weight

Installed weight	MTP with display	49.5 Kg
	Keyboard	6 Kg

Electrical requirements

Mains supply	single phase and neutral
Nominal voltage	198 to 268 volts
Frequency range	49 to 50.5 Hz and 59.4 to 60.6 Hz
Line current	2.3 amps
Power requirement	0.5 KVA

Heat dissipation

444 Watts

Cooling

Forced air cooling using two internal fans

Environmental range

Range 3

This section contains a list of orderable items by type number. With the exception of the second Dual Floppy Disc Drive, Hard Copy Printers, PID Readers, PIDs and character repertoires for keyboards, which are options, system enhancements are specified by means of conversion kits.

Note that in all conversions of Model 10 to Model 15, at least one keyboard must be fitted with a PID Reader. This item is not supplied with any of the conversion kits. Conversion of a Model 10 to Model 15 will, however, always include a pack of 5 console PIDs.

Type number	Description
SYSTEMS	
75010/01	7501 Model 10 20Kb single VT interactive terminal system
75010/02	7501 Model 10 20Kb two VT interactive terminal system
75015/01	7501 Model 15 40Kb single VT interactive/stand alone terminal system
75015/02	7501 Model 15 40Kb two VT interactive/stand alone terminal system
CONVERSIONS	
C1736/11	Convert 75010/01 to 75010/02
C1741/11	Convert 75010/01 to 75015/01
C1742/11	Convert 75010/01 to 75015/02
C1743/11	Convert 75010/02 to 75015/02
C1747/11	Convert 75015/01 to 75015/02
MODEM CONNECTORS	
F1931/00	Connector for UKPO Modems
F1932/00	Connector for OEM Modems
F1933/00	Connector for Sematrans 1203, 2401, 4801 Modems

PERSONAL IDENTIFICATION DEVICES (PID)

F1779/00	PID Reader
F1779/15	Pack of 10 VT PIDs
F1779/25	Pack of 5 Console PIDs
F1779/35	Pack of 5 Application Development PIDs

FOREIGN CODE SETS

F1776/00	Swedish SCR
F1777/00	Danish SCR

SECOND DUAL FLOPPY DISC DRIVE

7551/02	Second Dual Floppy Disc Drive for 7501

HARD COPY PRINTERS

7574/11	Hard Copy Printer (HCP-45) English SCR
7574/13	Hard Copy Printer (HCP-45) Danish SCR
7574/15	Hard Copy Printer (HCP-45) Swedish SCR
7576/10	Hard Copy Printer (HCP-180) English SCR
7576/12	Hard Copy Printer (HCP-180) Danish SCR
7576/14	Hard Copy Printer (HCP-180) Swedish SCR
7576/16	Hard Copy Printer (HCP-180) Arabic SCR

7576/18	Hard Copy Printer (HCP-180)Arabic Version 'L'
7576/22	Hard Copy Printer (HCP-180) Arabic Version 'K'