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10.1 Functional Description of TT

The TT is provided as an aid to fault finding diagnosis. It incorporates a monochrome VDU with keyboard, printer, cartridge tape recorder and modem (selectable 300, 1200, 2400, 9600 baud half duplex), and is connected to up to 6 CIs.

The VDU and keyboard is used to start the Interlockings and apply and remove restrictive controls such as route barring. The VDU may also be used to request specific status information such as Data Link telegram contents, faults not yet cleared, etc. The printer will provide a record of faults and controls and optionally, other information. It is also possible to use a remote VDU and modem to access the TT via a telephone line. This facility may be used to monitor the system status, but not to apply or remove controls or alter information stored within the TT.

All telegram changes, Signaller's Panel requests, faults and controls are placed by the TT into a buffer store. This buffer store can hold 100 individual messages or 1024 bytes, whichever is the lesser, noting that some messages are up to 20 bytes long. These messages are time stamped by the TT and then moved from the buffer store to a non-volatile storage medium to be available for off line analysis.

Further details regarding the TT can be found in M1303, "Mk2 Signalling System; Technical Manuals", and SSI8006, "SSI MkII Technician's Terminal (Menu Driven) User Guide to Remote Interrogation".

Although optional, it is recommended that a colour VDU and trackerball be added to the TT to provide a visual display of the state of the trackside equipment. This is also used in conjunction with a special Memory Module and adapter cables in each CI cubicle to provide an On Site Simulator capability. Details can be found in RT/E/C/11724 [Ref 11].

10.2 Equipment Details

The TT Terminal processor is contained in a 19" rack low-height cabinet. Associated with this are:

- System Terminal. This should be any ANSI-compatible VDU and Keyboard, e.g. Wyse WY520ES available from good computer suppliers.
- System Printer. This should be any ASCII text printer with an RS232 serial interface.
- Logger. This is usually a PC based TTLR using dual drive MO Disk or Flash Disk recording media, but at some older sites a dual-drive Penny & Giles System 7000 cartridge recorder may be in use.

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- Radio Clock. This is optional but advisable and is used to automatically set and maintain the system date and time without manual intervention. This must be an EES M210 with an LF Receiver Module configured to receive the 60kHz Anthorn time signal, a suitable antenna, and a Quad Serial Interface Module, or equivalent. Most IECCs will already have one in which case it will not be necessary to purchase another. If a new one is required, the installer is advised to contact Time and Frequency Solutions before ordering in order to ascertain the correct requirements. . The Radio Clock must be set up to output the time on its serial port when requested by the TT.

- Modem. This is optional but, if included, allows remote access of a sub-set of the facilities available on the VDU terminal. A 300, 1200, 2400 or 9600 baud RS232 modem is suitable.

- Trackside Graphic Display. This is normally only used in commissioning, but can be used to provide a graphic display of the railway during normal use. Lynwood Alpha VDUs were originally specified but these are now out of production. Instead, any PC with MSDOS or Windows 3.1/95/98™ can be used with the DeltaRail SSD program.

- Trackerball. This is only used if the colour VDU has been installed. A Penny & Giles trackerball type DTBI must be used.

Both Westinghouse and ALSTOM have manufactured SSI TTs. However, it is possible to construct a TT using components available off-the-shelf; a TT can be assembled using components available from the following companies:

Arcom Control Systems Ltd
Clifton Road
Cambridge
CB1 7EA
Tel: 01233 411200
Fax: 01233 410457

Acal Electronics Ltd
Redfields Park
Church Crookham
Hants
Tel: 01252 858585
Fax: 01252 858000

Dage Backplane Systems Ltd
Rabans Lane
Aylesbury
Bucks
Tel: 01296 393200
Fax: 01296 317833

Vero Electronics Ltd
Electron Way
Chandlers Ford
Eastleigh
Hants
Tel: 01703 266300
Fax: 01703 265126

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Penny & Giles Computer Products
1, Airfield Way
Christchurch
Dorset
BH23 3TE
Tel: 01202 481751
Fax: 01202 499279

EES Technology Ltd are now incorporated in
Time and Frequency Solutions
25, Eastways
Witham
Essex
CM8 3AL
Tel: 01376 514114
Fax: 01376 516116

Image Store Limited
Image Store House
Ecchinswell Road
Kingsclere, Nr Newbury,
Berkshire
RG20 4QG
Tel: 01635 297297
Fax: 01635 298603

Ibus UK Ltd
Unit 6, Chichester Business Park
City Fields Way
Tangmere
West Sussex
PO20 2LB
Tel: 0845 450 4500
Fax: 01243 756301

10.2.1 Tapes for the Penny & Giles System 7000

Where the Penny & Giles System 7000 remains in use as the TT logger, 300 foot DC300A type tapes or 450 foot DC300XL type tapes will be required. DC300XL are available under catalogue number 86/047240.

600 foot DC300XLJP or DC600A tapes, as used for IECC, are unsuitable and must not be used.

10.2.2 MO Discs for the TTLR

All MO discs conform to a common standard, and various makes can be used including Sony and TDK.

The TTLR system has been tested with 640 Mbyte discs and these should be used for data recording. They are also quicker to reformat than lower capacity discs. Although discs with lower capacity could be used in an emergency, it is strongly advised that 640Mbyte discs only are used. Use 640 Mbyte 2048 bytes per sector discs only.

Warning: Do not mix discs of different storage capacities or bytes per sector in operational use. Mixing discs of different capacity on the TTLR can cause the program to halt with loss of data; disc corruption is also possible.

MO discs are becoming difficult to obtain from information technology (IT) equipment stockists. Possible stockists include: Misco, Global and PC Business World and Image Store Limited.

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MO disc purchase requisitions must specify: magneto-optic, re-writable 3.5 inch discs, 640Mbytes capacity, 2048 bytes per sector, low level pre-formatted for MS-DOS.

Warning: MO discs are also available low level pre-formatted for Mac use, Mac formatted discs are totally unsuitable.

When MO discs are purchased they will already have a low-level format suitable for MS-DOS and Microsoft Windows applications (although this may not be realised by the supplier). They will need a high level format on-site before use with the TTLR. (Corrupted discs will also need formatting).

MO discs should be formatted using the standby TT or other PC containing MO drives. It is possible to format discs from within the logging program of the 'in service' TTLR, but this will cause a suspension of logging and possible loss of data.

10.2.3 Flash Disks for the TTLR

Due to the obsolescence of the MO disks, MO disk drives are no longer to be fitted to new systems. Instead the TTLR is to be fitted with an Adtron PC card SCSI unit with two PCMCIA 512Mb Flash Disks. The TT is required to be running SSI4301-D7 software or later. Suitable spare Flash Disks and facilities for their storage are required.

10.3 TT Variants

10.3.1 Motorola Micro-module system

These were used in the Category 1A and Category 1B schemes that have now been replaced.

10.3.2 STE card system

Category 2A schemes introduced the MkII TT, based on an STE card-based system for the Terminal Processor. This system uses a VDU and keyboard as the principal input/output device, with a separate printer for fault messages.

For Category 2A schemes the TT software was changed to fit the new hardware (SSI4301-C5), but retained the user interface as used on 1A and 1B systems.

The STE card-based system was further developed for Category 2B schemes. For these, the TT retained the same hardware as Category 2A, but included modified software with a menu-driven interface on the VDU (SSI4301-D4 software).

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A more recent TT Program version, SSI4301-D5, gives the following benefits:

- Improved data logging reliability and 5-second time markers on the logger;
- Paged memory allowing simultaneous use of trackside display feature and the data logger;
- Ability to interface to the Rugby clock, thus ensuring time synchronisation with other signalling and control systems;
- Improved dial-up remote access facilities;
- Improved fault reporting giving an alarm to signaller when data logger has failed.

Minor hardware modifications are required to utilise SSI4301-D5 as detailed in AEA Technology Rail document ELS-DOC-5212 Issue B.

TT Program version, SSI4301-D6 resolves detailed performance issues and changes information and fault messages to cover the use of the TTLR.

The SSI4301-D6 update covers the following problem fixes and minor enhancements:

- TT locking up when listing large numbers of Technician's Controls.
- TT failing to release a remote modem connection.
- Creation of log files without long time markers when the standby log tape/disc is ejected.
- An option to change logging drives after up to 40 days, as well as midnight or tape/disc full.
- Fault and information messages cover both tape and disc logging to avoid confusion at sites with disc loggers.
- Addition of a message to remind the user to apply controls when an interlocking is started.
- Addition of a warning message if the entry is incomplete when setting the time.
- When monitoring internal telegrams the status display is blank instead of 00000000.
- BST/GMT changeover takes place at 01:00 GMT (02:00 BST rather than 03:00 BST).

TT Program version, SSI4301-D7 resolves detailed performance issues present in previous versions.

The SSI4301-D7 update covers the following problem fixes and minor enhancements:

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- Inability to list, apply and remove Technician's Controls in the presence of a failure of PPM1 in an interlocking cubicle.

10.3.3 Technicians Terminal PC Logger Recorder

The SSI TT PC Logger Recorder (TTLR) is a replacement, based on a personal computer (PC), for the Penny and Giles (P&G) tape logger and the VT100 monitor on the MkII TT.

The PC permits Magneto-Optic (MO) or Flash Disk removable storage media with far greater capacity than P&G Logger Tapes to be used. The TTLR replicates all of the functionality offered by the P&G and VT100 terminal and offers a number of enhancements. The TTLR also provides greater versatility, improved reliability and simplified maintenance.

The user interface with the Technician's Terminal (TT) processor, via the keyboard, on-screen menus and the printer, are unchanged. Also, no internal hardware or software changes to the TT processor are required.

Warning: Locking the keyboard prevents commands being sent to the TT (which is in accordance with established TT security procedures). However, this does not prevent access to the other menus associated with the operation of the TTLR.

Two MO discs or Flash Disks provide the recording media, and the recorded data structure with hourly files and four tracks per drive remains unchanged.

Because of the greater storage capacity of the MO discs, it is recommended that SSI4301-D6 software is installed within the TT as this gives the user an option to change logging drives after up to 40 days, as well as midnight or tape/disc full. If SSI4301-D5 or earlier software remains for the TT Terminal Processor, the user will still have to change the discs every 24 hours to avoid data loss due to overwriting. If Flash Disks are used, software SSI4301-D7 is required because it contains essential bug fixes for this medium.

The TTLR may also be loaded with a Graphical Replay program to allow replay of recorded data. Replay of stored data is not possible when the PC is in the data logging mode and should be used only when the PC is not connected to an operational TT. Further description of the GR program can be found in Section 10.4.2.

10.4 Analysing Logged Data from a TT

There are currently two analysis tools available for interpreting the data stored on TT Logger tapes. The first of these is a DOS-based program that can produce a listing of the events stored on a TT Logger tape. The second tool is

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Windows™-based and is capable of graphically replaying events. Both programs have filtering facilities to restrict the amount of data displayed during analysis.

10.4.1 SSI TT Tape Replay

The SSI Technician's Terminal Tape Replay Program is a DOS-based application for analysing the contents of tapes produced by the TT data logger. This program is used for investigation of allegations against the signalling and for showing the time relationship of recorded events surrounding them.

There are three distinct functions that the TT Tape Replay Program performs:

- Reading data from a logger tape.
- Data selection filtering.
- Display of the selected data for analysis by the user.

Reading of the data from a tape requires a Penny & Giles cartridge recorder similar to those found in a TT. A user can select the start and end time of the data stored on the tape, the TT Tape Replay Program then copies this data to the hard drive of the PC ready for analysis. Where corruption prevents reading of the data in the usual manner, the TT Tape Replay Program allows the user to do a 'raw dump' of the data to the PC hard drive.

Once on the hard drive of a computer, data can be further filtered by time and data type prior to display.

Full details of the latest issue (D2) of the SSI TT Tape Replay Program can be found in SSU-D-SSS-UG-1, Issue 2 "Solid State Interlocking Technician's Terminal Tape Replay User Guide (PC Variant)".

10.4.2 SSI Graphical Replay

SSI Graphical Replay (SSI GR) is a PC based application that reads SSI TT log files and displays them in a visual style on a trackside mimic diagram. It can be used for investigation of faults and allegations against signalling equipment, showing the time relationship of recorded events surrounding them.

SSI GR is intended to operate on 'spare' SSI TTLR hardware but will also work on standard PCs with the Microsoft Windows NT™ or Windows XP™ operating systems. It will also work with data originally stored on a Penny & Giles cartridge recorder.

SSI GR does not operate at the same time as the TTLR software due to the different operating systems required. The SSI GR should not, under

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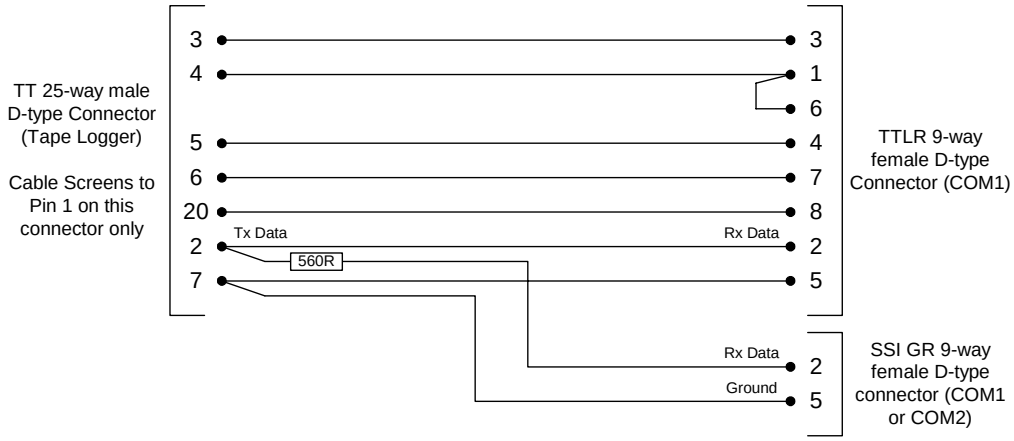
any circumstances, be activated on an 'active, in use' TTLR machine. Doing this on an active TTLR machine will both suspend logging and prevent control of the TT using the monitor feature of the TTLR.

When installed on TTLR hardware, SSI GR can read data recorded on TTLR Magneto-optical (MO) disc or Flash Disk media, 3.5 inch floppy disc or on the hard disc. SSI GR is capable of reading and displaying TT data recorded with 1 minute time markers (TT software SSI4301-D4 or earlier) and 5 second time markers (TT software SSI4301-D5 onwards).

The main output interface of SSI GR is a graphical representation of an area of railway based on the 'Lynwood' VDU pictures prepared for design office data testing and on-site simulation. With the facilities provided, a user can select the scheme and log data to be used for the replay. A text report, equivalent to that provided by the SSI TT Tape Replay program is also produced and can be reviewed on screen or printed by the user.

By using a suitable 'T' connection to connect a serial port on a PC running the SSI GR program to the TT to logger (or TT to TTLR) serial link, it is possible to display 'real-time' data on the SSI GR P; a schematic diagram of a suitable 'T' connection is shown next.



SSI GR 'T' Connection

The latest version of the SSI GR program (version 2) includes the following additional features:

- The software allows connections to at least four separate TT to logger links.
- Logging of 'live display' data to a disc file system on an SSI GR machine.
- Remote access to an SSI GR machine via dial-up modem and analogue telephone line or Ethernet Wide Area or Local Area Network for purposes of 'live display'.
- Access from outside the SSI GR application to analysis reports output from replay sessions (save report files).

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- Modification of the Graphical Replay View to allow users to open more than one 'picture file' for a replay session.
- Additional filters for Alarms/Messages and Panel requests.
- An output bar list pause button in live display mode to enable examination of data without it constantly scrolling to the last item.
- Equipment descriptions in the watch tab are coloured red for telegram bits set to a 'one' and blue for bits that are 'zero'.

Any user of SSI GR should be able to operate a PC with Windows NT™ or XP™ competently and be familiar with file handling and window control concepts. Competence in railway signalling terms and the SSI system is also needed to understand and interpret the results of SSI TT log analysis.

Full details of SSI GR can be found in Network Rail document SSI8509 "SSI Graphical Replay User Guide"

10.5 Extracting TT Logger Tapes and Discs Following Incidents

The TT tape logger contains two tapes for data storage; one in use and one standby. Although configured to switch between the two tapes at 24-hour intervals, is it possible that power disturbances can cause the TT to switch between the two tapes for data storage.

Therefore, the following procedure must be followed as soon as possible following an incident to ensure that data recorded by the TT is secured.

- Inspect the time on the TT and record any time difference compared to GMT.

- Eject the Offline tape (indicated by the non-illuminated 'ready' indictor) from the TT Tape Recorder and replace with a new tape.

- From the Command Menu on the TT, select the 'Eject logging tape & switch to Standby' command to eject the Online TT logger tape from the TT Tape Recorder; replace with a new tape.

- Ensure that both tapes extracted from the TT Tape Logger are labelled (Online and standby) and held in a secure place, along with a record of the time difference on the TT compared with GMT.

If the TT Hardware Upgrade has been applied to the TT, high-capacity Magneto-Optic (MO) discs will be in use rather than cartridge tapes; like tapes, these discs are rewriteable and the same procedure should be applied with extracting them from the TT following an incident.

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10.6 TT Standard Fault Messages

The possible standard fault messages, generated by the Technician's Terminal (TT) from each of the five monitored areas, their format and meanings are listed in the following tables.

10.6.1 Trackside Equipment Fault Messages

Fault:	SIGNAL <NAME> <ASPECT> MAIN FILAMENT
Meaning:	The main filament of the named aspect has failed.
Alarm:	None
Fault:	SIGNAL <NAME> <ASPECT> PROVING
Meaning:	A searchlight signal aspect proving has failed.
Alarm:	Critical
Fault:	SIGNAL <NAME> <ASPECT> LAMP
Meaning:	The lamp of the named aspect has failed.
Alarm:	Critical
Fault:	POINTS <NAME> <NORMAL>DETECTED <REVERSE> <NOT CONTROLLED
Meaning:	The points detection has failed in the direction stated.
Alarm:	Critical
Fault:	POINTS <NAME> <NORMAL> OPERATION <REVERSE>
Meaning:	The points have failed to move in the direction requested, but are still detected in the opposite direction.
Alarm:	Critical
Fault:	POINTS <NAME> <NORMAL> CONTACTOR <REVERSE> <NOT CONTROLLED>
Meaning:	The points Contactor has failed in the direction stated (electric point machines).
Alarm:	Critical
Fault:	ROUTE INDICATOR <NAME> LAMP
Meaning:	A lamp of the route indicator named has tailed.
Alarm:	Critical
Fault:	ROUTE INDICATOR <NAME> MAIN FILAMENT
Meaning:	The route indicator named has main filament failure (used if a fibre optic route indicator has twin filaments).
Alarm:	None

10.6.2 TFM and Data Link Fault Messages

Fault:	POINTS MODULE <NUMBER> MOTOR DRIVE
Meaning:	The Points Module (PM) is reporting a continuous run fault on a clamp-lock motor drive.
Alarm:	Non-Critical
Fault:	SIGNAL MODULE <NUMBER> <OUTPUT> INTERFACE <IN PUT>
Meaning:	The Signal Module (SM) concerned has failed its interface.
Alarm:	Critical

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Fault:	POINTS MODULE <NUMBER> <OUTPUT> INTERFACE <INPUT>
Meaning:	The PM concerned has failed its interface.
Alarm:	Critical
Fault:	OUTWARD LINK FAULT AT TFM <NUMBER> <LINK A> <LINK B>
Meaning:	The Trackside Functional Module (TFM) is reporting loss of incoming data on one link.
Alarm:	Non-Critical
Fault:	NO REPLY FROM TFM <NUMBER> <LINK A> < LINK B> <BOTH LINKS>
Meaning:	The Multi-Processor Module (MPM) is not receiving replies from the TFM.
Alarm:	Non-Critical if only one link, but Critical if both links.
Fault:	NO REPLY FROM <NAME> <LINK A> <LINK B> <BOTH LINKS>
Meaning:	No replies are being received from any TFM in the location.
Alarm:	Non-Critical if only on one link, but Critical if both links.
Fault:	OUTWARD LINK FAULT AT <NAME> <LINK A> <LINK B>
Meaning:	All TFMs connected to the named location are reporting loss of data on one link.
Alarm:	Non-Critical
Fault:	OUTWARD LINK FAULT AT AND BEYOND <NAME> <LINK A> <LINK B>
Meaning:	All TFMs at and beyond the named location junction or repeater are reporting loss of data on one link.
Alarm:	Non-Critical
Fault:	NO REPLY FROM AND BEYOND <NAME> <LINK A> <LINK B> <BOTH LINKS>
Meaning:	No reply has been received from any module at or beyond the given Data Link Module (DLM), repeater or from the Central Interlocking (Cl) itself.
Alarm:	Non-Critical if only one link, but Critical if both links.
Fault:	NO REPLY, TFMs ON POWER SUPPLY <NAME>
Meaning:	No reply from all TFMs associated with the named power supply.
Alarm:	Critical
Fault:	COMMON TRACKSIDE FAULT
Meaning:	A failure has occurred in the same place on both data links. This may mean two separate non-critical faults have combined to give a critical situation.
Alarm:	Critical

10.6.3 Central Interlocking Fault Messages

Fault:	ICP MESSAGE LOSS ID = {XX}
Meaning:	The MPM{D} is not receiving internal data ink messages from the Cl with the specified identity number.
Alarm:	Non-Critical
Fault:	ICP MESSAGE LOSS ON {DL A} {OWN INT} {DL B} {ALL OTHER INTS} {ALL INTS}
Meaning:	The MPM{D} is not receiving messages on one of the internal data links.
Alarm:	Non-Critical

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Fault:	PATH FAILURE ON {TDL A} { } {TDL B} {MPM1} {IDL A} {MPM2} {IDL B} {MPM3}
Meaning:	One or more of the CI MPMs have developed a path failure in their links to the DLM/Long Distance Terminals (LDTs), in the CI cubicle. This probably indicates a fault in the DLM/LDT but if only one MPM is affected the fault may be in the MPM or cubicle wiring.
Alarm:	Non-Critical
Fault:	INTERLOCKING (1) OFF-LINE (2) (3)
Meaning:	The CI has gone off-line.
Alarm:	Non-Critical
Fault:	INTERLOCKING TOTAL SHUT-DOWN
Meaning:	The MPM(D) has stopped receiving telegrams transmitted by the CI MPMs. This probably indicates a total SHUT-DOWN of the CI.
Alarm:	Critical
Fault:	INTERLOCKING {1} {RECEIVE DATA FAULT} {LINK A} {2} {STATUS BYTE Rx FAULT} {LINK B} {3} {IDL A} {IDL A} {PANEL PROCESSOR 1} {PANEL PROCESSOR 2} {BOTH PANEL PROCESSORS}
Meaning:	The CI is receiving faulty data from the named source. The status fault probably means that a panel processor is off-line.
Alarm:	Non-Critical for single fault, Critical for common faults.
Fault:	INTERLOCKING TIMING OUT
Meaning:	The CI is timing out for four minutes after a Mode 1 or Mode 2 start. No routes may be set and all outputs are held at the most restrictive state.
Alarm:	None
Fault:	INTERLOCKING TIMING COMPLETE
Meaning:	The CI timeout is complete, routes may be set and outputs may be energised provided that the Interlocking has been enabled.
Alarm:	None
Fault:	INTERLOCKING ENABLED
Meaning:	The CI has been enabled using the start control, routes may be set and outputs energised provided that the timeout is complete.
Alarm:	None
Fault:	INTERLOCKING DISABLED
Meaning:	The CI is disabled as a result of a Mode 1 start-up or by the application of a STOP control. No routes may be set and all outputs are held at the most restrictive state.
Alarm:	None
Fault:	{PANEL PROCESSOR 1} RECEIVE DATA FAULT {INTERLOCKING 1} {PANEL PROCESSOR 2} {INTERLOCKING 2} {PANEL PROCESSOR 1 & 2} {INTERLOCKING 3} {PMUX}
Meaning:	The Panel Processor is receiving faulty data from the named source. If faults are reported from all three CI MPMs, suspect a faulty Panel Processor Module {PPM}.
Alarm:	Non-Critical for single faults, Critical for common faults.

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Fault:	PANEL MUX {RECEIVE DATA FAULT} {PANEL PROCESSOR 1} {INPUT CARD} {PANEL PROCESSOR 2} {OUTPUT CARD} {BOTH PANEL PROCESSORS} {SCANNER 1} {SCANNER 2} {SCANNERS I & 2}
Meaning:	The PMUX is reporting the listed fault in one or the other or both PPMs.
Alarm:	Non-Critical for single faults, Critical for common faults or for input and output cards.
Fault:	SYSTEM (REDUNDANCY) FAULT CODE XXXXXX
Meaning:	This is issued when a CI MPM shuts down to a redundancy fault, to provide supplementary information to assist second line maintenance with fault finding within the MPM.
Alarm:	None
Fault:	SYSTEM (PANEL) DATA FAULT CODE XXXXXX
Meaning:	A geographical data error has been detected within the CI MPM or PPM. The first two digits of the code specify the fault type and the remaining four digits may specify an address in the geographic data where the fault has been found. This message is also used to allow the PPMs to report errors in information received from an Integrated Electronic Control Centre (IECC) network.
Fault:	None

10.6.4 Diagnostic MPM Fault Messages

Fault:	DIAGNOSTIC PROCESSOR INPUT/OUTPUT BUFFER OVERFLOW
Meaning:	The MPM(D) has been unable to cope with the number of faults encountered and can also indicate the changes of state have not been logged onto the tape correctly.
Alarm:	None
Fault:	DIAGNOSTIC PROCESSOR INCOMPLETE INTERLOCKING FAULT REPORT
Meaning:	The sequence of CI fault report messages has been corrupted. The DMPM is unable to report the fault messages.
Alarm:	None
Fault:	DP - MESSAGE FAULT @ XXXX
Meaning:	The DMPM cannot send a message due to a fault in its message data at the address specified.
Alarm:	None
Fault:	DP - GEOG DATA FAULT @ XXXX
Meaning:	The DMPM has detected an unexpected geographic data type at the given address.
Alarm:	None
Fault:	DP - GEOG DATA OK
Meaning:	The previously detected geographical data problem has now cleared.
Alarm:	None
Fault:	DP - MESSAGE OVERFLOW
Meaning:	The DMPM has attempted to produce a message which is too long for it to handle - possibly a geographical data error.
Alarm:	None
Fault:	lCP GD - COMPARISON FAILURE - BYTE (XX)
Meaning:	At least one byte of the internal communications processor data stored in the DMPM differs from that stored in the internal communications processor. This implies corruption of memory within the DMPM.
Alarm:	Non-Critical

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