



AUSTRALIAN RAIL TRACK CORPORATION

INFRASTRUCTURE, STRATEGY AND PERFORMANCE

Engineering Standards and Documents

The following recommendation, together with the attached supporting documentation, has been considered at the ARTC Risk & Safety Committee Meeting held on 7th May 2007.

Documents:

Ref No:	08-08-10-058 - Equipment Type Approval
Subject:	'SAFETRAN' Geographic Signalling System (GEO)
Dated:	18 th January 2007.

Prepared By: Arthur Haberlin, Signal Engineer - Equipment

Endorsed by: Trevor Moore, Signal Standards Engineer

Items Considered for Approval:

Manufacturer:	SAFETRAN Systems (Invensys)
Product:	Electronic Coded Track Circuit equipment (GEO)
Item Identification:	See item list Ref No: 02-0605-027a

The items in the form presented at the review date were approved for System & Equipment Approval to be used on all ARTC jurisdictions in accordance with the manufacturers published performance criteria and subject to the following.

Relevant ARTC Specifications:

Ref. No.	Title	Status	Date
SPS 02	Environmental Conditions	Issue 1 Revision 2	May '05
SCP 05	Electrical & Electronic Components (Ratings & Construction Requirements)	Issue 1 Revision 2	May '05
SCP 17	Computer-Based Interlocking requirements	Issue 1 Revision 3	October '06
SDS 17	Track Circuits	Issue 1 Revision 2	March '05

Specific Conditions of Approval:

- i.** All design for track circuit operation shall assume a train shunt of 0.2 Ω and a ballast resistance of 1.5 Ω /km and may be used for track circuits from 1.5km to 5.5km long.
- ii.** A special design analysis shall be undertaken and the results shall be submitted for Safety Committee approval in each instance before GEO track circuits are applied to

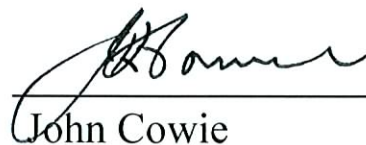
- dual gauge track (one track circuit equipment detecting trains on either gauge).
- iii. GEO track circuits may be applied only to rails in which no electric traction current is conducted.
 - iv. Design documentation shall record track related dimensions in both metric (meters) and imperial (feet) with the imperial dimensions always shown in parenthesis following the metric.
 - v. Output relays for vital circuits and for 'red-retaining' function shall be miniature plug-in vital 12v relay similar to WRSA QS2 type.
 - vi. Any circuits connected to the GEO cardframe, other than connections directly to rails and signal heads, shall be housed entirely (including the circuit busbar power supply unit) within the same equipment enclosure.
 - vii. Restoration to normal operation from 'red-retaining' mode shall require a vital reset (possibly remote) independent from the 'red-retained' module.
 - viii. Vital communication to adjacent signalling equipment (other than via the track-circuit code) shall utilise parallel input / output circuits.
 - ix. For use in accordance with ARTC specification SDS 25 and standard typical circuits which shall be developed and approved specifically for GEO equipment based system only. Circuits shall include surge protection provided in accordance with ARTC specification SCP 04 'Lightning and Surge Protection Requirements' for Electronic equipment subject to Category C exposure.
 - x. The GEO system CPU shall not be used to implement interlocking logic for points, releases or controlled signals.
 - xi. Only components from the list **02-0605-027a** may be utilised.
 - xii. All modules of a given type at a site (included in the same circuit book) shall use the same version of the executive software.
 - xiii. Operations, Maintenance and Safeworking procedures, including amendments to routine maintenance and testing standards e.g. SMP 25, shall be published before the equipment is commissioned.

Certificate Issued to:

Westinghouse Rail Systems
Australia
179-185 Normanby Rd.
South Melbourne
Victoria 3205

A general condition of approval is that the supplier remains accredited to ISO 9001 specifically for these products and ARTC is advised on a 12 monthly basis that accreditation is current. ARTC reserves the right to conduct its own audit of the manufacture and supply of these components to AS 19011:2003. Any subsequent change to the design, materials or manufacturing process is not covered by this approval.

Approved for use in the ARTC



John Cowie
Manager Standards

APPROVAL No: 08-08-10-058

Approval Date: **7th May 2007**



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Ref No: 02-0605- 027a

Date: 18th January 2007

Systems & Equipment Approval

Subject: ‘SAFETRAN’ GEO Interlocking System

The following lists the individual components (by catalogue number) of the GEO Interlocking System manufactured by SAFETRAN (Invensys) which are approved for use in signalling installations on ARTC infrastructure under Systems & Equipment Approval Certificate **08-08-10-058** subject only to any conditions shown on that Certificate and the Conditions of Use shown against individual types.

Product Code	Revision	Item Type	Conditions of Use
Hardware			
Complete Assemblies			
9000-53215	?	End Track Unit (ETU) 1 x CPU module + 1 x Track module	Used only to act as a track feed interface only.
91§§-53245-§0000	3.4	Intermediate Track Unit (ITU) 1 Track cct. 1 x CPU module + 1 x Track module + 3 x I/O slots	For each I/O slot substitute § with: 0 - for no I/O module, 1 - for VPI module, 2 - for VRO module, 3 – not approved, 4 – for CLS module or 5 - for RIO module.
92§§-53245-§0000	?	Intermediate Track Unit (ITU) 2 Track cct. 1 x CPU module + 2 x Track module + 3 x I/O slots	
93§§-53230-§§000	1.4	Loop Track Unit (LTU) 1 x CPU module + 3 x Track module + 4 x I/O slots	
Modules			
9000-53260-000B	2.4	CPU - Processor	
9000-53268-0002	1.7	CPU2 - Processor	Only non-vital serial communication to/from the processor unit approved.



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Product Code	Revision	Item Type	Conditions of Use
9000-53265-0001	B10	TRK - Track Circuit Interface	Shunt pick count set to 3 cycles; vital change count set to 2 cycles; shunt drop and non-vital change counts set to 1 cycle minimum.
9000-53254-0001	A7	LIN - Line Circuit Interface	May be substituted for TRK module for communication over a line circuit.
9000-53266-0001	B3	RIO - Vital Relay I/O	♣ Vital input circuits shall be double cut.
9000-53261-0001	A2	VPI – Vital Parallel Input	♣
9000-53262-0001	3.8	VRO – Vital Relay Output	
9000-53264-0001	D2	CLS – Multi Lamp Signal	♣ Auxiliary vital output shall drive a ‘red-retaining’ relay.
8000-80438-000¶	A1	ECD - External Configuration Device	One required for each cardframe. ¶ = 1 for 32k, = 2 for 64k memory.
Cardframe only			
9000-53208	-	ETU cardframe 1xCPU slot, 1xTrack slot	
9000-53246	-	ITU cardframe 1xCPU slot, 2xTrack slots & 3xI/O slots	
9000-53231	-	LTU cardframe 1xCPU slot, 3xTrack slots & 4xI/O slots	
Ancilliary Equipment			
231-710 / 026-000	n/a	10 way I/O connector	
??	CIC	Cardframe Identity Chip	
Software			
System (Module) Software			
9V355-A02J	J	CPU - Vital Processor Exec.	Only file geo00_31.mef approved for installation; Checksum 2617.



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Product Code	Revision	Item Type	Conditions of Use
9V354-A02B	B	CPU - Vital Processor Boot	Only file 9V354A01.B approved for installation.
9V458-A02M	M	CPU2 - Vital Processor Exec.	Only file vpd01_10.mef approved for installation; Checksum AAB0.
9V464-A02N	N	CPU2 - Comm's Processor Exec.	Only file ncp01_12.mef approved for installation; Checksum 8E2D.
9V455-A02C	C	CPU2 - Vital Processor Boot	Only file 9V455A01.C approved for installation; Checksum D04E.
9V785-A01C	C	CPU2 - Comm's Processor Boot	Only file 9V785A01.C approved for installation.
9V365-A02W	W	TRK module - Processor Exec.	Only file trk01_12.mef approved for installation; Checksum A3FB.
9V494-A01D	D	LIN module - Processor Exec.	Only file Lin00_13.mef approved for installation; Checksum B265.
9V453-A01C	C	RIO module - Processor Exec.	Only file rio01_04.mef approved for installation; Checksum 07AA.
9V359-A01B	B	VPI module - Processor Exec.	Only file vpi00_09.mef approved for installation; Checksum EA75.
9V360-A01B	B	VRO module - Processor Exec.	Only file vro00_09.mef approved for installation; Checksum 68EF.
9V364-A01M	M	CLS module - Processor Exec.	Only file CLS01_10.MEF approved for installation; Checksum CD6A.
9V391-A01A	A	I/O module - Processor Boot	Only file 9V391A01.A approved for installation; Checksum 5889.

♣ Vital inputs de-bounce time to be set to 40 ms.