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Title: **USER'S MANUAL**
TR4240/TR7240 TRANSCEIVER

REVISIONS

REVISIONS

REV	DESCRIPTION	DATE	ENGINEER
00	TBD	10/30/13	P. VACHRANUKUNKIET
01	FCC	1/11/17	S. SINGH

REV	DESCRIPTION	DATE	APPROVED

		DOC SPEC	
		DWN	
		CHK	
10077443		ENG P. VACHRANUKUNKIET	
Used On		APPD	



Size A

Scale: N/A

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Important Information to our Users in North America

FCC Regulatory Compliance Statement

Checkpoint Systems, Inc., offers Electronic Article Surveillance (EAS) or Radio Frequency Identification Products that have been FCC certified or verified to 47 CFR Part 15 Subparts B/C. Appropriately, one of the following labels will apply to the approval:

NOTE: This equipment has been tested and found compliant within the limits for a class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

- OR -

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) including this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation, which may include intermittent decreases in detection and/or intermittent increases in alarm activity.

Industry Canada Regulatory Compliance Statement

This device complies with the Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le fonctionnement de l' appareil est soumis aux deux conditions suivantes:

- (1) Cet appareil ne doit pas perturber les communications radio, et
- (2) cet appareil doit supporter toute perturbation, y compris les perturbations qui pourraient provoquer son dysfonctionnement.

Equipment Safety Compliance Statement

Checkpoint's Electronic Article Surveillance (EAS) products have been designed for safeness during normal use and, where applicable have been certified, listed, or recognized in accordance with one or more of the following safety standards; UL 60950-1, CSA C22.2 No. 60950-1-07. Additional approvals may be pending.

WARNING: Changes or modifications to Checkpoint's EAS equipment not expressly approved by the party responsible for assuring compliance could void the user's authority to operate the equipment in a safe or otherwise regulatory compliant manner.

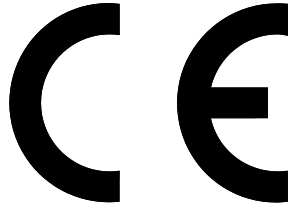
Equipment Compliance Statement

WARNING: Changes or modifications to Checkpoint's EAS or Radio Frequency Identification (RFID) equipment not expressly approved by the party responsible for assuring compliance could void the user's authority to operate the equipment in a safe or otherwise regulatory compliant manner.

Important Information to our Users in Europe

CE Regulatory Compliance Statement

Where applicable, Checkpoint Systems, Inc. offers certain Electronic Article Surveillance (EAS) products that have CE Declarations of Conformity according to R&TTE Directive 99/5/EC, EMC Directive 2004/108/EC, and Low Voltage Directive 2006/95/EC.



System Electromagnetic Compatibility (EMC) has been tested and notified through Spectrum Management Authorities if necessary, using accredited laboratories, whereby, conformity is declared by voluntarily accepted European Telecommunications Standards Institute (ETSI) standards EN 301489-3 and EN 302208 and/or EN 300330, as applicable.

NOTE: Certain Electronic Article Surveillance (EAS) equipment have been tested and found to conform to the CE emission and immunity requirement in Europe. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Under unusual circumstances, interference from external sources may degrade the system performance, which may include intermittent decreases in detection and/or intermittent increases in alarm activity. However, there is no guarantee that interference will not occur in a particular installation. If this equipment experiences frequent interference from external sources or does cause harmful interference to radio communications reception, which can be determined by turning the equipment off and on, please contact a Checkpoint Systems representative for further assistance.

RoHS Compliance Statement

The RoHS Directive stands for "the restriction of the use of certain hazardous substances in electrical and electronic equipment." A RoHS compliant product means that electrical and electronic equipment cannot contain more than maximum permitted levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE). Checkpoint is in compliance with the RoHS directive.

WEEE Compliance Statement

The Waste Electrical and Electronic Equipment Directive (WEEE) applies to companies that manufacture, sell, distribute, or treat electrical and electronic equipment in the European Union. There are a number of obligations imposed on Checkpoint as a supplier of electrical and electronic equipment. Checkpoint's compliance approach for each of these obligations is provided below.

WEEE Marking

All products that are subject to the WEEE Directive supplied by Checkpoint are compliant with the WEEE marking requirements. Such products are marked with the "crossed out wheelie bin" WEEE symbol shown below in accordance with European Standard EN 50419.

Information for Users

According to the requirements of European Union member state WEEE legislation, the following user information is provided in English for all Checkpoint supplied products subject to the WEEE directive.

This symbol on the product or on its packaging indicates that the product must not be disposed of with normal waste. Instead, it is your responsibility to dispose of your waste equipment by arranging to return it to a designated collection point for the recycling of waste electrical and electronic equipment. By separating and recycling your waste equipment at the time of disposal you will help to conserve natural resources and ensure that the equipment is recycled in a manner that protects human health and the environment. For information about how to recycle your Checkpoint supplied waste equipment, please contact the Checkpoint Systems, Inc. Field Service office in your region. Customers can obtain this information from their system User's Guide.



REACH Compliance Statement

The European REACH Regulation 1907/2006 on Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH), Annex XVII entered into force in June 2009, and affects all companies producing, importing, using, or placing products on the European market. The aim of the REACH regulation is to ensure a high level of protection of human health and the environment from chemical substances.

Checkpoint Systems' substances management system follows and complies with the current revision of the REACH Regulation on the substances as identified by ECHA (European Chemical Agency).

Checkpoint Systems' products are considered articles as defined in REACH Article 3 (3).

These products/articles under normal and reasonable conditions of use do not have intended release of substances. Therefore the requirement in REACH Article 7 (1) (b) for registration of substances contained in these products/articles does not apply.

Checkpoint Systems' products/articles do not contain Substances of Very High Concern or if there are SVHC in the product/article, the content is less than the 0.1% (wt/wt) as defined by REACH Article 57, Annex XIV, Directive 67/548/EEC. Therefore the requirement in REACH Article 7 (2) to notify ECHA if a product/article contains more than 0.1% wt/wt of an SVHC and tonnage exceeding 1 tonne per importer per year is not applicable.

Checkpoint Systems' European operations do not manufacture or import chemicals, therefore Checkpoint Systems no obligation to register substances.

Packaging Compliance Statement

No CFCs (chlorofluorocarbons), HCFCs (hydrofluorocarbons) or other ozone depleting sub-stances are used in packaging material. Chromium, lead, mercury, or cadmium are not intentionally added to packaging materials and are not present in a cumulative concentration greater than 100 ppm as incidental impurities. No halogenated plastics or polymers are used for packaging material. Checkpoint complies with the EU Directive 94/62/E.

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1.0 INTRODUCTION

The TR4240/TR7240 transceiver is the electronics PCB system of a pulse-listen Electronic Article Surveillance (EAS) detection system which utilizes targets that are applied to merchandise. Compared to TR4240, the primary electronics in this document (TR7240) features advanced functions including network and serial communication, as well as enhanced connectivity to peripheral devices such as people counters.

Checkpoint provides targets tuned to different frequencies in the HF ranges; 8.2 MHz, 7.2 MHz, 9.2 MHz, 9.5 MHz, etc... When an article of merchandise is purchased, the target is deactivated which causes it to no longer resonate. The pulse-listen EAS system monitors one or more detection zones (typically an area 3 feet on either side of the antenna) in the 7.2 MHz to 9.9 MHz band, and triggers an alarm when a non-deactivated target is detected.

2.0 GENERAL DESCRIPTION

The pulse-listen EAS detection system consists of three main components including the antenna, the Primary Electronics, and the power supply. The antenna is constructed with two “canceling” loop designs consisting of a 2-Loop, a 3-Loop, and a single-Loop which is a “shorted turn” contributing to far-field EM cancellation. The Primary Electronics detects targets in the field of the primary antenna in which it is mounted.

The TR4240/TR7240 PCB integrates both the processing logic controller, consisting of a Blackfin DSP and a FPGA, and the analog section, consisting of two class D HF transmitters, a direct sample HF receiver, an RF selector switch, and an ADC used to digitize a tag signal for the FPGA to process. The detection method is known as “direct sampling” and addresses environmental noise by identifying RF saturation in the local environment, and the electronics use DSP to process the incoming RF signals for better accuracy and certainty of when a tag signal is received (vs. noise). The external power supply is a switching mode with 24 VDC output voltage. Depending on the power supply used, it could have 1.5A or 2.1A of output current capability.

3.0 SPECIFICATIONS

3.1 MECHANICAL

PCB Layers:	8
PCB Materials:	FR-4 laminate, Solder Mask over bare copper, Electroless Nickel/Immersion Gold finish
Dimensions:	29.59 x 12.7cm [11.65 x 5.00in]

3.2 ELECTRICAL

CPU:	300 MHz ADSP-BF536 Embedded DSP processor
System Clock:	100 MHz
Interrupts:	LVC MOS/LVTTL Level input
VCC:	+1.2V @ 150 mA typ. +2.5V @ 30 mA typ. +3.3V @ 600 mA typ.

3.3 MEMORY

Addressing: Up to 512 Mbyte for SDRAM, 64 Mbyte for Async memory space
Memory Package: 54-pin TSOP for SDRAM, 56-pin TSOP for FLASH Memory

3.4 ENVIRONMENTAL

Operating Temperature: 0° to + 60° C
Non-Condensing Relative Humidity: 5% to 95%

4.0 POWER SUPPLY REQUIREMENTS

Primary Electronics requires +24 VDC for operation. An AC-DC converter external power supply rated at 24VDC nominal, 2.7A maximum, complying with IEC/UL 60950-1 2nd Ed.+Am1 and evaluated to clause 2.5 (LPS) of the mentioned standards is required.

+24 VDC is supplied though power connector J18 or J31.

The pin assignments for the power connector are as follows:

PIN #	SIGNAL
1	+24V RTN
2	GND
3	+24V

Table 1: Power Connector Pin Assignments

The input +24V is converted to +12V, +5V, +3.3V, +2.5V and +1.2V through DC-DC converters integrated within the PCB circuitry. Both switch mode and linear regulators are used.

5.0 DEVICE LABELING

The TR4240/TR7240 modules have been labeled with their own FCC ID number and if the FCC ID is not visible when the module is installed inside another device, then the outside of the finished product into which the module is installed must also display a label referring to the enclosed module. This exterior label displays this following:

MODEL: TR4240/TR7240 TRANSCEIVER

S/N: 10059624XXXXXXXXXX

Contains IC: 3356B-TR7240R

-or-

Contains FCC ID: D04TR7240R

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

6.0 LIST OF ANTENNAS AND CONTROLLER BOXES PERMITTED TO BE FITTER WITH THE TR4240/TR7240 TRANSCEIVER MODULE.

Antenna Type/Controller Box	Aisle Width	Antenna Structure	Antenna Size
Evolve P10 iRange	7.5 ft	2-loop/3-loop/o-loop	67" x 19.5"
Evolve P20 iRange	6.0 ft	2-loop/3-loop/o-loop	67" x 12.5"
Evolve P20S iRange	6.0 ft	2-loop/3-loop with shield	67" x 12.5"
Evolve G10 iRange	7.5 ft	2-loop/3-loop/o-loop	64.5" x 19.5"
Evolve G30	6.0 ft	2-loop/3-loop/o-loop	59" x 10"
Evolve G35 iRange/Classic Style	6.0 ft	2-loop/3-loop/o-loop	59" x 10"
Evolve E10 2.0 ANT RF	6.5 ft	2-loop/3-loop/o-loop	59" x 17"
Evolve F10 iRange	6.5 ft	Ferrite core flat	60" x 8"
Evolve P30 iRange/Classic Street	6.0 ft	2-loop/3-loop/o-loop	60" x 13"
Evolve S10	6.0 ft	Ferrite core round	67" x 5"
Evolve W10	6.0 ft	2-loop/3-loop/o-loop	67" x 20"
Classic Trend/PX	6.5 ft	2-loop/3-loop/o-loop	66.5" x 19.5"
Classic Plus/QX	5.0 ft	2-loop/3-loop/o-loop	66.5" x 12.5"
Classic N10	4.0 ft	2-loop	32" x 6.3"
Evolve S10 Remote Elec Ctrl	N/A	N/A	N/A
Evolve F10 iRange Remote Elec Ctrl	N/A	N/A	N/A
Evolve iRange Remote Elec Ctrl	N/A	N/A	N/A

Table 2: List of antennas and controller box

7.0 MAIN PCB CONNECTIONS (PERIPHERAL I/O)

The peripheral I/O will be used to control various peripheral devices. The table below lists the connector number and their respective description. These connectors are located on the main board.

CONNECTOR	PIN #	LABEL	PIN DESCRIPTION	FUNCTION
J2	1		TX1 A	Pri. 2-Loop or PAB via coupler
	2	TX1	Ground	
	3		TX1 B	
J3	1		TX2 A	Pri. 3-Loop or SAB via coupler
	2	TX2	Ground	
	3		TX2 B	

CONNECTOR	PIN #	LABEL	PIN DESCRIPTION	FUNCTION
J9	1	Alg In	Input	Alarm Group
	2	Alg Out	Output	
	3	Gnd	Ground	
	4	Gnd	Ground	External Alarm Group
	5	Rly Alg+	Com. Dry Contact Output	
	6	Rly Alg-	N.O. Dry Contact Output	
J11	1	+24VDC		
	2	LTS2+	SAB Lights+	SAB Lights
	3	LTS-	PAB/SAB Lights Return	
	4	LTS+	PAB Lights+	PAB Lights
	5	SND1-	PAB Sound Return	PAB Sounder
	6	SND1+	PAB Sound+	
J19	1	MP	Dry-Contact Input	Metal Point
	2		Dry-Contact Input	
J18/J31	1	Ret	+24VDC Return	Pedestal Main Power
	2	Gnd		
	3	+24v	+24 VDC	
J20/J22	1	Rx A	RS485 A	IPC
	2	Rx B	RS485 B	
	3	GND	Ground	
	4	SYNC+	SYNC A	SYNC
	5	SYNC-	SYNC B	
	6	GND	Ground	
	7	Tx A	RS485 A	IPC
	8	Tx B	RS485 B	
J41	1	RLY CNT+	Counter +	External Counter
	2	RLY CNT-	Counter Ground Return	
J54	1	+24VDC		
	2	LTS2+	SAB Lights+	SAB Lights
	3	LTS-	PAB/SAB Lights Return	
	4	LTS+	PAB Lights+	PAB Lights
	5	SND2-	SAB Sound Return	SAB Sounder
	6	SND2+	SAB Sound+	
J39	1	LTS2+	SAB Lights+	SAB Lights
	2	LTS+	PAB Lights+	PAB Lights
	3	LTS-	PAB/SAB Lights Return	
	4	SND1+	PAB Sound+	PAB Sounder
	5	SND1-	PAB Sound Return	
	6	+24VDC		
J25	1	LTS+	PAB Lights+	PAB Lights
	2	LTS2+	SAB Lights+	SAB Lights
	3	LTS-	PAB/SAB Lights Return	
	4	SND2+	SAB Sound+	SAB Sounder
	5	SND2-	SAB SoundReturn	
	6	+24VDC		
J48	1		RS-232 RX Data	Badge Board
	2		RS-232 TX Data	
	3		Ground	
	4	BADGE	Power (+3.3 Vdc)	
	5		Ground	
	6		Local Alarm Disable Input	
	7		Pedestal Reset Input	
	8		Global Alarm Disable Input	

Table 3: Main PCB Connections

8.0 COMMUNICATIONS BOARD I/O

CONNECTOR	PIN #	LABEL	PIN DESCRIPTION	FUNCTION
J72	1	PEOPLE CTR	RS-485	VisiPlus
	2		GND	
	3		RS-485	
	4		+24VDC	
J11	1	INTLK1	KEY1	Key Switch 1
	2		KEY1	
	3		NC	
	4		NC	
	5		INTLK1-	Deactivation Interlock 1
	6		INTLK1+	
J54	1	INTLK2	KEY2	Key Switch 2
	2		KEY2	
	3		NC	Sounder 2
	4		NC	
	5		INTLK2-	Deactivation Interlock 2
	6		INTLK2+	
J51	1		RS232 Rx	

	2		RS232 Tx	Evolve Modem Communications
	3		GND	
	4		+5VDC	
	5	MODEM	GND	
	6		NC	
	7		RS232 CTS	
	8		RS232 RTS	
J44	1		RLY1 NC	
	2		RLY1 NC	
	3	EXT RLY	GND	
	4		RLY1 NO	
	5		RLY1 NO	
	6		GND	
J45	1		RLY2 NC	External Relay 2
	2		RLY2 NC	
	3	EXT RLY	GND	
	4		RLY2 NO	
	5		RLY2 NO	
	6		GND	
J1	1			Ethernet

Table 4: Communications Board I/O