INSTALLATION GUIDE FOR EADS TMR880i TETRA MOBILE RADIO AND CUR-3 CONTROL UNIT

Contents

1 General information

The EADS TETRA TMR880i mobile radio conforms to the ETSI standards for compatible digital TETRA networks. It has been targeted to meet the demanding communications requirements of professional mobile radio users, from voice communication to messaging and data transmission.

1.1 Terminology

EMC   ElectroMagnetic Compatibility

ESD   ElectroStatic Discharge

1.2 Contact

For any support regarding this installation guide, please contact Tetra Terminals HelpDesk TetraTerminals.Helpdesk@eads.com

2   EADS TMR880i Technical Specifications

The EADS TMR880i TETRA mobile radio fulfils the following specifications for TETRA radio equipment in the temperature range –20 to +55 ^{o}C : ETS 300 392-2 Voice and Data Air Interface, ETS 300 394 Voice and Data Conformance testing and ETS 300 395 V + D Air Interface.

Operation mode	Trunked mode (TMO, duplex and semi-duplex) and Direct mode (DMO, simplex)
Frequency Band	
	RC9: TMO TX 380-390 and 410-420 MHz TMO RX 390-400 and 420-430 MHz DMO TX & RX 380-400 and 410-430 MHz
	RC16: TMO TX 806-825 MHz TMO RX 851-870 MHz DMO TX & RX 806-825 and RX 851-870 MHz
Output power	ETS 300 392-3 compliant power class 3
Receiver class	Class A
Durability	Control unit CUR-3 is water and dust resistant (IP55 classification).
Operating voltage	from 10.8 V to 15.6 V DC

Dimensions & weight

Control Unit

Length x Height	190 x 72 mm
Thickness	26 mm (36 mm with rotary switch)
Weight	240 g

Radio unit

L x H x W	182 x 60 x 125 mm
Weight	1004 g

Interfaces	External control unit 16 configurable I/O pins (e.g. External alarm) Multiple audio devices Programming through Hirose connector in system cable Serial data NMEA output External power on/off External PTT External emergency PTT Ignition sense
Display	2,6inch Illuminated high-contrast full graphics colour display 65,536 colours, 130 x 130 pixels
Keypad	Alphanumeric keypad, Power On key, selection keys, 4-way navigation keys, volume keys, Red Function key, Duty key, Fast Menu key, Group selector, Back key, Display brightness key
Current consumption	RX idle average 600 mA (CUR-3 lights on, GPS on, audio on) TX average 1.4 A (CUR-3 lights on, GPS on) Power supply requirement 8 A

3 Sales packages for TMR880i

The TMR880i has two separate sales packages. A radio package is a customer specific and CUR-3 Control Unit sales package is generic for all customers. The CUR-3 Control Unit is available in 5 different keymat variants: Latin, Arabic, Chinese, Korean and Greek.

3.1 Radio sales package

Typical customer radio sales package contains a transceiver unit, system cable CA-105, installation plate and screws as well as 1-3 user guides.

3.2 Control Unit CUR-3 sales package

The CUR-3 Control Unit sales package contains a CUR-3 control unit with 5.5 m installation cable CA-103 and speaker microphone cable installed, loudspeaker, installation swivel HHR-1, hands-free PTT and a hands-free microphone and optionally a speaker microphone.

3.3 Basic configuration

Please read all installation guidelines carefully through and follow them carefully (see Chapter 7). EADS cannot guarantee the targeted functionality if EADS´s installation instructions are not properly followed.
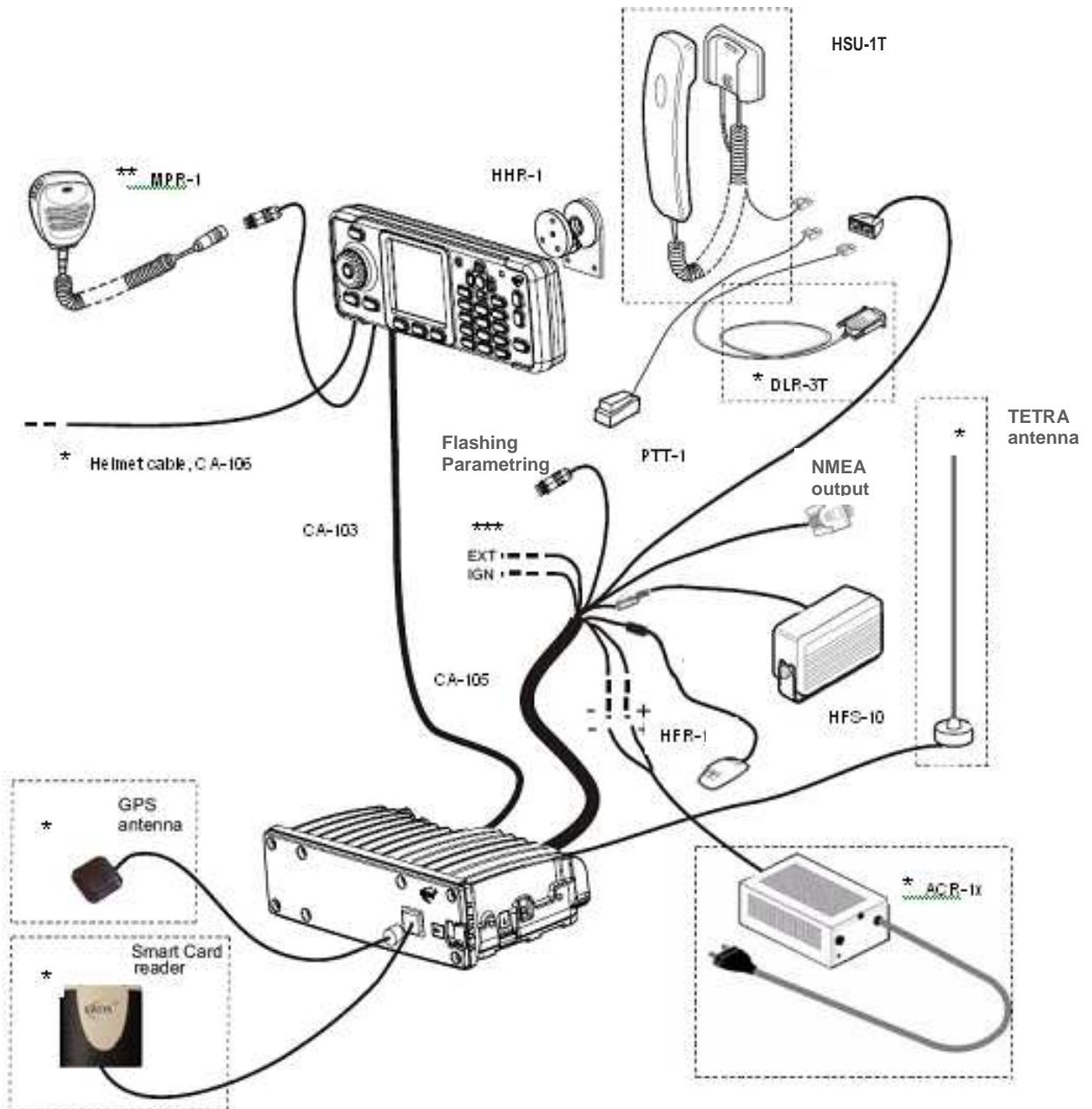
* Not included in the sales package.

** May be included in the sales package. Please check from your sales contacts.

*** EXT line can be used to connect external emergency button into the radio unit via system cable. Functionality of this button is similar to CUR-3 red function key.

***IGN line can be used for external power supply into the radio from the 12V voltage controlled by vehicles ignition key. IGN line shall be

connected to corresponding IGN line in vehicles power switch. If IGN line is connected and vehicle is switched on, power is also supplied to radio via IGN line. Once vehicle is switched off, there is user request to continue radio operation; otherwise radio will also be switched off as IGN line gets down.

4 Connectors and PIN-layouts

Connectors in the back-front

1. System Connector (§4.2)

.2 Control Unit Interface Connector (§4.3)

      Installation cables   from 0.75m to 10m

      Overall diameter: 8.3±0.2 mm

      Minimum bending radius: 5 x D

3. Auxiliary Accessory Connector (I/O Pins) (§4.4)

Antenna Connector (§0)

> **Warning:** Both Control unit and auxillary connectors are DB-26 female. Make sure you connect the CUR-3 cable to connector 2, otherwise I/O can be damage and radio should go to repair center.

Connectors in the front panel

GPS Antenna Connector (§4.6)

External Smart Card Connector (§4.5)

Connectors in CUR-3

Speaker microphone connector (§4.1)

Helmet cable connector (§5)

Overall diameter:	5.9±0.2 mm
Minimum bending radius:	5 x D

See Chapters 7.1.1 and 7.1.2 for placements of speaker microphone and helmet cable connectors.

All optional accessories which will be connected to CUR-3 control unit shall be EMC tested before use.

4.1 Speaker microphone cable and connector

Speaker microphone cable is used to provide connection from Control Unit (CUR-3) to the Speaker microphone MPR-1. The cable is an accessory which can be connected permanently to a PWB connector of the CUR-3 through opening in the back cover. The opening is sealed and protected by a cable clamp. If the speaker microphone cable is not installed, the opening in CUR-3 must be protected by a gum plug.

Other end of the cable provides connection to the speaker microphone. 12-pin Hirose plug is used for connection with MPR-1 Speaker Microphone (HR30-7J-12PC). The Hirose connector is used for speaker microphone.

Face-view of 12-pin Hirose Connector:
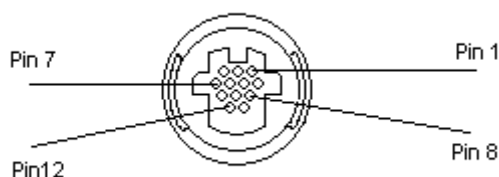
Technical data:

Pin	Signal	Parameter	IN/OUT	Min.	Typ.	Max.	Unit	Notes
1	SPM_PTT	Speaker-mic PTT	IN	0	0	0.1	VDC	PTT pushed
					1.8		VDC	PTT released
2	V_CTRL	VBAT regulator control	IN	0	0	0.1	VDC low	
						2.7	VDC high	
3	Data	N/A			N/A			
4	Data	N/A			N/A			
5	SPM_SPK-	Speaker-mic LSP+	OUT			4	VPP	
6	Data	N/A			N/A			
7	GND			0	0	0.1	VDC	
8	SPM_MIC+	Speaker-mic microphone	IN		2.1		VDC level	DC level

Pin	Signal	Parameter	IN/OUT	Min.	Typ.	Max.	Unit	Notes
9	SPM_SPK+	Speaker-mic LSP+	OUT			4	VPP	
10	SPM-MIC-	Speaker-mic microphone	IN					
11	Data	N/A			N/A			
12	Data	N/A			N/A			

4.2 System Connector

The system connector is a male 26-pin high density D connector which makes all the main connections. These include the power feed, HF equipment, Helmet connection, and data interface.

The data interface in the system connector is used for the data applications with DLR-3T data cable. The programming interface (DAU-9H) in system cable connector cannot be used simultaneously with PEI interface (DLR-3T).

Face view of 26 pin high density D connector (radio part):
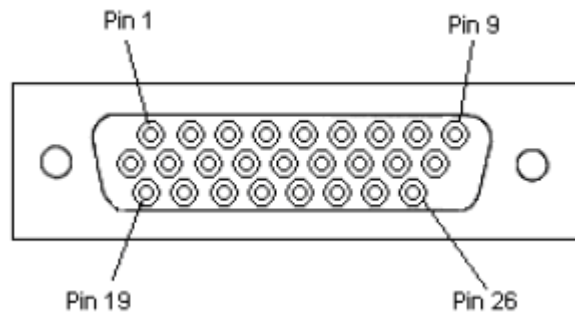
Technical data:

Pin	Signal	Parameter	IN/OUT	Min.	Typ.	Max.	Unit	Notes
1, 2, 3	CARBAT+	The external supply voltage	IN	10.8	13.2	15.66	V A	
4	EXT_EMERGENCY	External Emergency PTT button	IN	0	0 5	0.1	VDC VDC	Signal Stand by. State change by ground.
5	+10V	Supply voltage for the data cable DLR-3T and handset HSU-1T	OUT	9.5	10 11	10.55 200	VDC mADC	
6	Data	N/A						
7	Data	N/A						
8	HS_MIC	Handset microphone input	IN		200 5	500 2	Ω mVrms Vpp VDC	Source impedance Signal level Maximum signal level DC level if DLR-3T connected
9	AGND	HS_MIC ground			0	0.1	VDC	Connected to cable shields of HS_EAR and HS_MIC
10	CARBAT-	External supply voltage ground	IN					Combined with line 19
11	Data	N/A	IN					
12	GPS_TX	RS-232 level TX line for NMEA output	OUT	+/-5	+/-8		V	Voltage swing
13	Data	N/A	IN					
14	HS_PTT	PTT button for Handset and HF	IN	9.5	0 10	1 10.55	VDC VDC	PTT-standby / low state PTT pushed / high state
15	Data	N/A						
16	HS_HOOK	Handset Hook recognition	IN	0 5.1	3.3 6.6	0.8 5.24	VDC VDC kΩ kΩ	Hook on/audio off/ Low state Hook off/audio on/ High state/ pull-down in acc. pull-up in acc.
17	GND			0	0	0.1	VDC	
18	HS_EAR	Handset earphone output	OUT	10	35 10		mVrms µF kΩ	signal level series output capacitance HS impedance to gnd
19	CARBAT-	External supply voltage ground	IN					Combined with line 10

Pin	Signal	Parameter	IN/OUT	Min.	Typ.	Max.	Unit	Notes
20	IGS	Ignition sense line, Recognises the car start	IN		12		VDC	Fuse included on the cable line. [1]
21	Data							
22	Data							
23	HF_MIC+	Hands Free device microphone input	IN		2.1 60		V mVrms	DC voltage level
24	HF_MIC-	Hands Free device microphone input	IN		0			
25	SPK+	Hands Free device loudspeaker output	OUT			10	Vpp	
26	SPK-	Hands Free device loudspeaker output	OUT			10	Vpp	

[1] IGS command is associated with a timer. This line can be used from the 12V voltage controlled by vehicles ignition key. Once vehicle is switched off, there is user request to continue radio operation; otherwise radio will also be switched off as IGS line gets down.
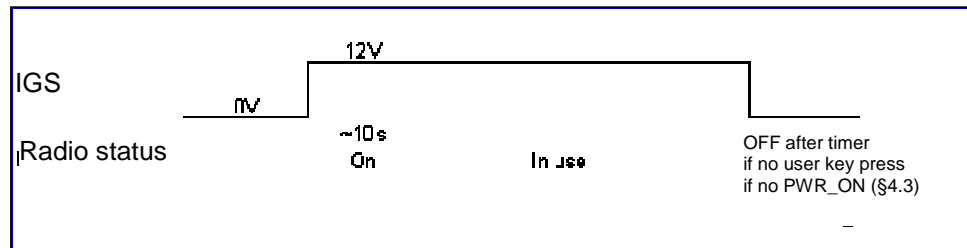
4.3 Control Unit Interface Connector

The CUR-3 connector provides an interface for the external control unit. The connector is a female 26 pin high density D connector. The display data bus parallel to TMR880i display controls and serial data interface are converted to RS-485 level. The connector includes also an audio interface and the voltages supply for the control unit.

Face view of 26 pin high density D connector (radio part):
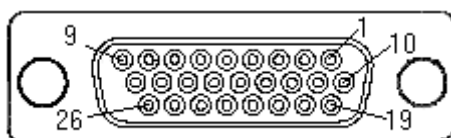
Technical data:

Pin	Signal	Parameter	IN/OUT	Min.	Typ.	Max.	Unit	Notes
1	/LCD_RES	Display Reset	OUT	2.3		0.7	V V	Logic low Logic high
2	/SCE+	Display Chip Select, RS-485	OUT		2.5	3	V	Driver common mode output voltage
3	/SCE-	Display Chip Select, RS-485	OUT		2.5	3	V	Driver common mode output voltage
4	SDATA+	Display Serial data, RS-485	OUT		2.5	3	V	Driver common mode output voltage
5	SDATA-	Display Serial data, RS-485	OUT		2.5	3	V	Driver common mode output voltage
6	SCLK+	Display Serial clock, RS-485	OUT		2.5	3	V	Driver common mode output voltage
7	SCLK-	Display Serial clock, RS-485	OUT		2.5	3	V	Driver common mode output voltage
8	CU_TXD+	Ext. CU control data from TMR880i, RS-485	OUT		2.5	3	V	Driver common mode output voltage
9	CU_TXD-	Ext. CU control data fromTMR880i, RS-485 data	OUT		2.5	3	V	Driver common mode output voltage
10	GND							
11	CU_RXD+	Ext. CU control data to TMR880i, RS-485	IN	-7		+12	V	Common mode voltage limits
12	CU_RXD-	Ext. CU control data to TMR880i, RS-485	IN	-7		+12	V	Common mode voltage limits
13								
14	VB	+12V output from car battery voltage	OUT					
15	PWR_ON_CU	PWR button from ext. CU	IN		2,1	0.7	V V	Logic low Logic high (1)
16	CU_PTT	PTT button from Ext. CU	IN	-0.5 2.0		0.8 5.5	V V	Logic low Logic high

Pin	Signal	Parameter	IN/OUT	Min.	Typ.	Max.	Unit	Notes
17	CU_REG_CTRL	Ext. CU voltage regulator control	OUT	4.0	5	0.8	V V	Logic low Logic high
18,19	GND							
20	EXT_MIC+	Ext. CU microphone, Connected to HS mic input using an analogue MUX	IN		0.5		Vrms	Signal level
21	EXT_MIC-	Ext. CU microphone ground	IN		0		V	
22	GND							
23	EAR+	Audio to Ext. CU	OUT			4	Vpp	Connected to audio PA
24	EAR-	Audio to Ext. CU	OUT			4	Vpp	Connected to audio PA
25	VB	Car battery voltage	OUT	10.8	13.2	15.6	V	Supply voltage to the Ext. CU
26	CARBAT-	Car battery ground	OUT		0			

(1) When CUR-3 is connected, level is 2.1 V at VBAT 13.2 V (there is 4k7 in this line in CUR-3, and 1k0 to GND inside radio

4.4   Auxiliary Accessory Connector

This connector offers an interface for different auxiliary accessories such as status panel, different external function buttons and parallel functions to the front panel buttons. The connector is a female 26 pin high density D connector. Inputs or outputs of GEN_IO pins in the interface can be programmed to match needed connections using parametering SW.

Face view of 26 pin high density D connector (radio part):
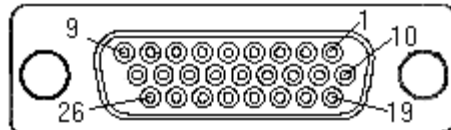
Technical data:

| Pin	Signal	Parameter	IN/OUT	Min.	Typ.	Max.	Unit	Notes
1-9, 11-17	GEN_IO	Programmable I/O	IN/OUT	-0.5 2.0 4.0		0.8 5.5	V V V	Low level input High level input High level output **Maximum 8 mA** [1]
10	EXT_ALARM	External alarm control	OUT					Open collector/ drain output **Maximum 0.5 A** [2]
18, 19	GND							
20	HS_MIC+	Audio input, connected to HS microphone input	IN			0.2	Vrms	Activated by HS_HOOK [3]
21	HS_MIC-	Audio input, HS mic signal ground	IN		0		V	
22	LINE_OUT	Audio output, connected to HS ear output	OUT			0.2	Vrms	Activated by HS_HOOK [3]
23	PWR_ON	External power-on switch	IN	0	0	0.1	VDC	PWR_ON active PWR_ON inactive open (pull-up resistor in phone) [4]
24	GND							
25	EXT_VOUT2	+12V output	OUT	10.8	13.2	15.5	V	Filtered from car battery voltage **Maximum 0.5 A**
26	GND							

[1] **PINS 1-9, and 11-17 Programmable (with Parametering Software) I/O** Pins, are 5V logic outputs / inputs. **Maximum current is about 8mA**. External "amplifier" (transistor) needed to control relay.

[2] **PIN 10 EXT Alarm** is named the "open collector" – output. **Maximum current is 0.5A** (Internal diode installed).

[3] **HS_HOOK** is the handset hook recognition (see §4.1 PIN 16 of system connector).

[4] **PWR_ON** should stay open during inactive phase and should be grounded during active phase:
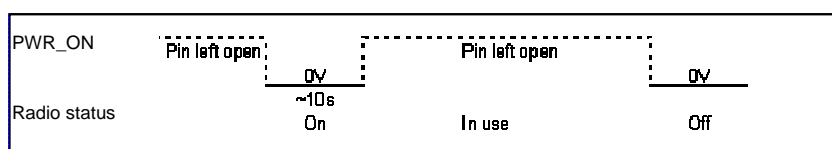
4.5 External Smart Card Connector

This connector offers the interface for an external smart card reader (DD-5) through an RJ45 connector.

Face view of RJ45 smart card reader (radio part):
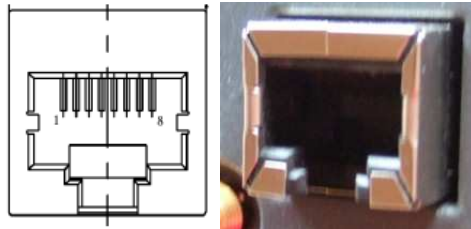
The length of external smart card reader cable is app. 1800 mm.

4.6 Active GPS antenna connector

This connector provides the interface for the active GPS antenna with output supply 5V, 30mA through an SMA (female) connector.

Face view of SMA GPS antenna (radio part):

4.7   TETRA antenna connector

This connector provides the interface for the TETRA RF antenna (50 ohm) through a TNC (female) connector.

Face view of TNC TETRA antenna (radio part):

4.8   Smart card connector

This connector provides the interface for a smart card or SIM card.

Face view of smart card connector (radio part):

5 Helmet cable installation

5.1 Introduction

Helmet installation cable is used to provide connection from Control Unit (CUR-3) to the motorbike installation set. The cable is an accessory which can be connected permanently to a PWB connector of the CUR-3 through opening in the back cover. The opening is sealed and provided by a cable clamp. If the helmet cable is not installed, the opening in CUR-3 must be provided by a gum plug. Other end of the cable is left open to allow motorbike specific installations. The cable provides connection to helmet microphone and speaker and 3 control buttons/handles.

5.2 Circuit diagram

Cable connections are presented in Figure 1. The microphone interface is specified for an electret microphone and it does not need any extra components. Some external components are needed if a dynamic microphone is used. Modifications for a dynamic microphone are represented in the next chapter.
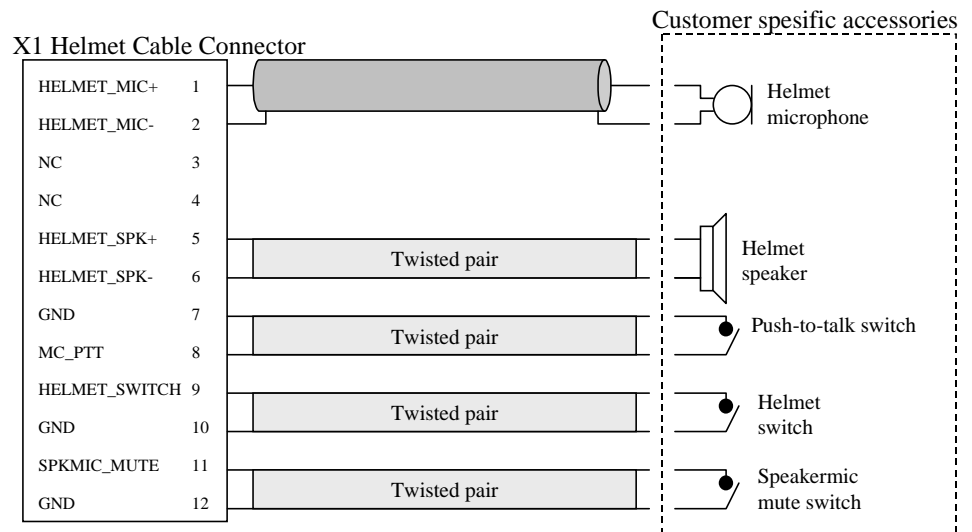
Figure 1   Circuit diagram of helmet cable

5.3   Detailed description of the helmet interface

5.3.1   Microphone Input Interface

Helmet cable microphone input is presented in Figure 2. Microphone input is balanced type interface. Microphone interface includes ESD suppression and EMC filtering circuitry. Interface includes also biasing circuit for the electret microphone.

Connection with unbalanced accessories *(microphone and speaker use same ground)* is not allowed. If common ground will be used, microphone interface must be equipped with applicable audio balun. Using common ground the electret microphone must be equipped with external bias circuitry.
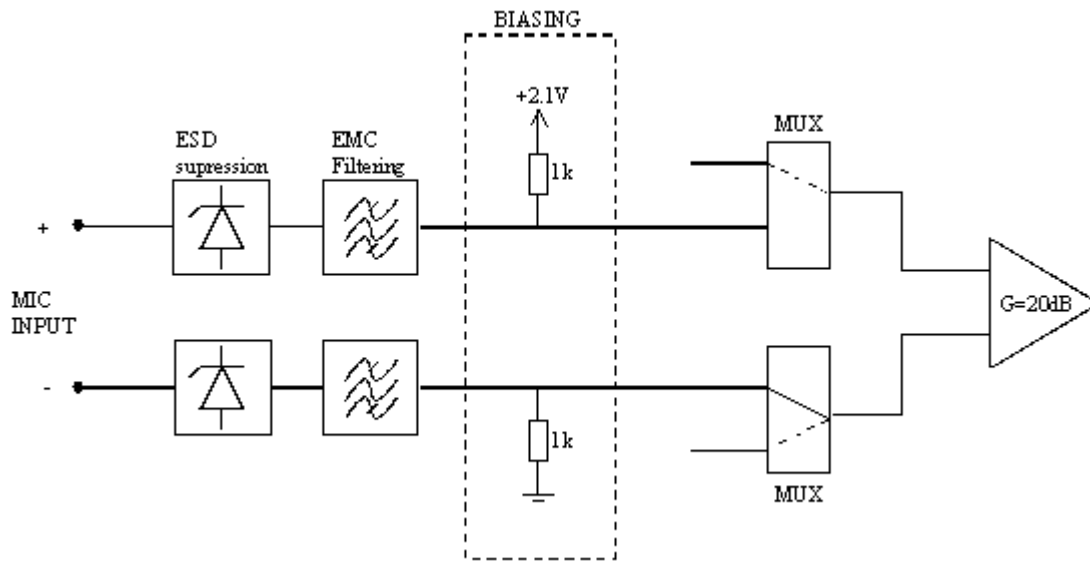
Figure 2   Helmet Cable Microphone Input Flowchart

5.3.1.1   Electrical Specifications

Table 1   Microphone Input Electrical Specifications

Parameter	Min.	Typ.	Max.	Unit	Notes
Input impedance		2		kΩ	
Biasing voltage		1.7		V	Biasing voltage level to 2kΩ microphone impedance.
Input level			200	mV$_{pp}$	Maximum differential peak to peak input voltage level to the microphone input.

5.3.1.2   Modifications For A Dynamic Microphone

The microphone input has been specified for electret microphone. If dynamic microphone is used, an external amplifier must be used. External amplifier gain must be up to +20dB. Amplifier circuit must be matched to the electret microphone 2kΩ input impedance.

5.3.1.3   Selection Of The Electret Microphone Capsule

Be sure that the selected electret microphone capsule is RF noise-resistant type and it fulfils *89 / 336 / EEC EMC directive*, because most of the electret microphones are very sensitive for the RF-noise. HELMET_MIC+ and HELMET_MIC- inputs are filtered against RF-noise, but there is no possibility to filter audio frequency noise, which has been indicated from the RF-signal in microphone capsule.

5.3.2   Speaker Output Interface

Speaker output interface is presented in Figure 3. Speaker output is balanced type interface. Quiescent voltage in speaker outputs referred to system ground is about 2.4 V. Speaker output lines have been protected against EMC and ESD.

Connection with unbalanced accessories *(microphone and speaker use same ground)* is not allowed. If common ground will be used, speaker interface must be equipped with applicable audio balun.
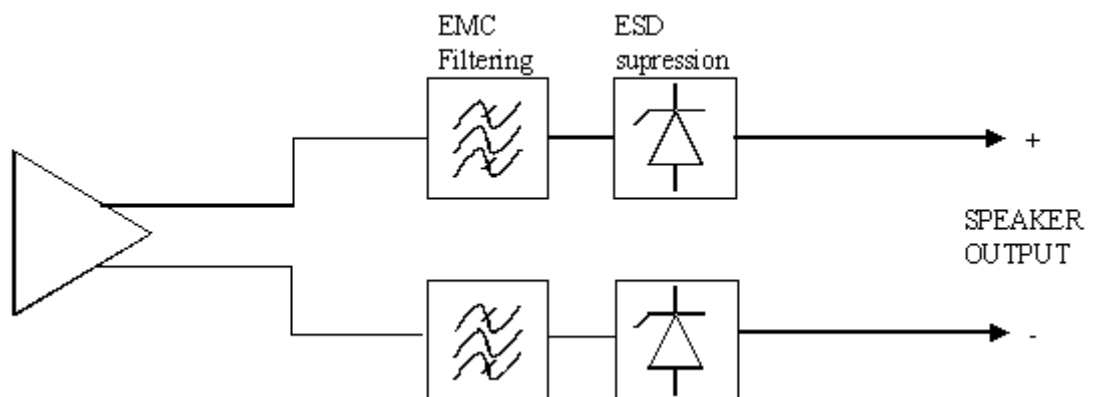
Figure 3   Speaker Output Flowchart

5.3.2.1 Electrical Specifications

Table 2   Speaker Output Electrical Specifications

Parameter	Min.	Typ.	Max.	Unit	Notes
Load Impedance	4			Ω	Min. load impedance, which can be connected between speaker outputs, without producing audible distortion. *
Output power			1.1	W	@ $R_L = 8\ \Omega$, THD = 0.5%, f = 1kHz
Output level			4.8	V_{pp}	Max. Differential peak to peak output voltage between speaker output lines.
Output bias		2.4		VDC	Quiescent voltage between speaker outputs and system ground. **

* Note that usually most helmets include two speakers, which have been connected parallel.

** Bias voltage is available only when audio path is open, for example when receiving transmission, keypad tones etc.. HELMET_SWITH must be closed to enable helmet interface, including speaker output.

5.3.3   Control Signals

Helmet cable interface includes three control signals. These signals are presented in Table 3. Detailed connection instructions are presented in Table 4.

Signal lines have got internal pull-up resistors and all these three signals are low active. These control signals are controlled against system ground. Every signal wire is paired with its own ground wire. See Table 4.

Table 3 presents functions of the control signals and switches' contact types.

Table 3   Control Signals

Control Signal	Contact type	Function
MC_PTT	OFF-ON	External push to talk button for semi-duplex calls. (ON) = momentary contacts. Switch is closed when it is pressed and open when released. Contacts return automatically to OFF position
HELMET_SWITCH	OFF-ON	Enables helmet microphone. When using the helmet interface, this switch should be closed.
SPM_MUTE	OFF-ON	Disables control unit (Keypad locked, all audio off, keypad and display lights switched-off only display active). Note that this does not affect external speaker if connected to RC-9.

5.4   Technical Specification

Connections, pin numbers, cable colours, thickness of cable and acceptable limits for electrical requirements are shown in Table 4. Also lines included in certain cables and their thickness is listed in table 4.

Table 4   Connections in X1 (Helmet Cable connector)

Pin	Line Symbol	In/Out	Cable colour	Cable thickness	Pair with line (pin)	Min.	Typ.	Max.	Unit	Notes
1	HELMET_MIC+	IN	in Coaxial	AWG26	HELMET_MIC-		2.1		V	DC level (Impedance between MIC+ and MIC- lines 2kΩ)
2	HELMET_MIC-	IN	Coaxial shield	AWG26	Connected to the cable shield of	0	0	0.1	VDC	

Pin	Line Symbol	In/Out	Cable colour	Cable thickness	Pair with line (pin)	Min.	Typ.	Max.	Unit	Notes
					HELMET_MIC+ line					
3	NC					0	0	0.1	VDC	
4	NC					0	0	0.1	VDC	
5	HELMET_SPK+	OUT	White	AWG26	HELMET_SPK- (6)			4.5	Vpp	
6	HELMET_SPK-	OUT	Brown	AWG26	HELMET_SPK- (5)			4.5	Vpp	
7	GND	OUT	Green	AWG26	MC_PTT (8)	0	0	0.1	VDC	
8	MC_PTT	IN	Yellow	AWG26	GND (7)		2.8	0.1	V V	Logic low Logic high
9	HELMET_SWITCH	IN	Grey	AWG26	GND (10)		2.8	0.1	V V	Logic low Logic high
10	GND	OUT	Pink	AWG26	HELMET_SWITCH (9)	0	0	0.1	VDC	
11	SPKMIC_MUTE	IN	Blue	AWG26	GND (12)		2.8	0.1	V V	Logic low Logic high
12	GND	OUT	Red	AWG26	SPKMIC_MUTE (11)	0	0	0.1	VDC	

EADS
DEFENCE
& SECURITY

6 Accessories

Accessory	Type	Code
Speaker microphone	MPR-1	T0690018
HF microphone	HFR-1	T0690020
Loudspeaker 3W	HFS-10	T0692006
Push-to-Talk switch	PTT-1	9780282
Handset	HSU-1T	T0640121
Data cable	DLR-3T	T0730227
AC Power Supply	ACR-1E, Euro Plug	T0080802
AC Power Supply	ACR-1X, UK Plug	T0080803
AC Power Supply	ACR-1U, US Plug	T0080804
Swivel mount	HHR-1	T0620064
System cable	CA-105	T0730628
Installation cable, 0,75m	CA-116	HG5178B
Installation cable, 1.5m	CA-108	HG5178A
Installation cable, 5.5m	CA-103	T0730625
Installation cable, 10m	CA-104	T0730627
Helmet cable	CA-106	T0730632
GPS antenna	AN-5	HR7773AA
Combined TETRA/GPS antenna 380-430MHz	AN-6	HR7774AA
Fixed mount TETRA antenna 380-430 MHz	AN-7	HR7775AA
Magnet TETRA antenna 380-430MHz	AN-9	HR7816AA
Smart card reader	DD-5	T0632189
Combined TETRA/GPS antenna 806-870MHz	AN-12	HR8126AA
Installation cover	N/A	9452555
Extra connector	N/A	HT8418AA
Fuse 5A 125°C rated	N/A	PK1705A

Accessory	Type	Code

DIN-slot installation set
    DIN-slot installation adapter
    DIN-slot installation bracket
	N/A	T0087632

Installation plate	N/A	9500318

Notice that some of the accessories might not be available in all countries. Please check the availability from your local distributor.
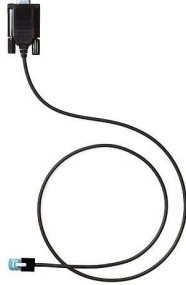
Please check your warranty terms before connecting other than those EADS own accessories.

TMR880i can be assembled in a desktop kit. The installation manual of the desktop kit is available as a separate document.

6.1 Handset (HSU-1T)

6.2   Data Cable (DLR-3T)

6.3   Antennas (AN-5, AN-6, AN-7, AN-9, AN-12)

AN-5: Magnet GPS antenna

AN-6: Combined TETRA and GPS antenna 380-430MHz
AN-12: Combined TETRA and GPS antenna 806-870MHz

+ 2 cables

+ FME/TNC connector

AN-7: Fixed mount TETRA antenna 380-430MHz

+ cable

+ FME/TNC connector

AN-9: Magnet TETRA antenna 380-430MHz

+ FME/TNC connector

Please check from your sales contacts for other antennas.

6.4 CUR-3 installation Cables (CA-103, CA-104, CA-108, CA-116)

6.5   Power supply (ACR-1E, ACR-1U, ACR-1X)

6.6   Speaker Microphone (MPR-1)

MPR-1 is optionally included in CUR-3 sales package. Please check from your sales contact.

6.7 Swivel mount (HHR-1)

6.8 External Smart Card Reader (DD-5)

Note: Smart card is not included in DD-5 package. Please check the availability of smart cards from your sales contacts.

Other parts

6.8.1   Installation plate (9500318)

6.8.2   Installation cover (9452555)

6.8.3   DIN installation set (T0087632)

DIN installation set consists of DIN-slot installation bracket and adapter. Adapter is mounted inside the DIN-slot installation bracket and will be locked with solenoid.

DIN-slot installation bracket

DIN-slot installation adapter

6.8.4 Extra connector (HT8418AA)

6.8.5 Fuse 5A 125℃ rated (PK1705A)

7   Considerations for TMR880i installation

Please read these installation guidelines carefully through and follow them faithfully. EADS cannot guarantee the targeted functionality if EADS´s installation instructions are not properly followed.

7.1   Assembly instructions for CUR-3

7.1.1   Installation cable and optional helmet cable assembly

Installation cable CA-103 (or alternatively CA-104, CA-108, CA-116) is assembled to connectors in left side of CUR-3 as can be seen in Figure 4 below.

In the same Figure 4 below, optional helmet cable CA-106 is assembled to connector on the right side of CUR-3. Fit the rubber plug (around the helmet cable) to its place in the back cover. See also helmet cable assembly instruction in Chapter 5.
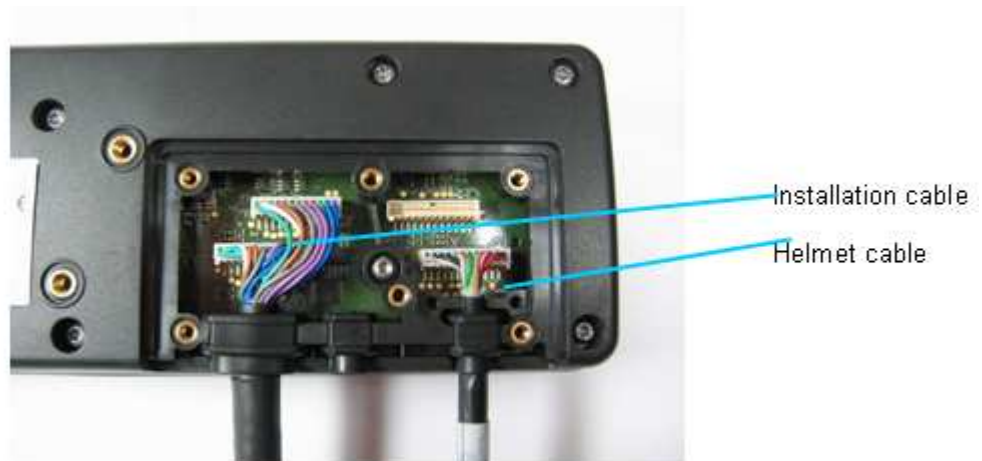
Figure 4   CA-103/CA-104/CA-108/CA-116 Installation Cable and CA-106
                  Helmet Cable assembly

7.1.2   Front panel cable for speaker microphone (MPR-1)

The connector for the speaker microphone is Hirose HR30-7J-12PC.

The connection to the circuit board is implemented using wires to the SMK CGP4512-0101 connector. The Hirose connector is used for the speaker microphone. The speaker microphone can be connected straight to this connector.

Figure 5   Fastened cable cover

Figure 6   Speaker microphone connector

7.1.3   Swivel (HHR-1) Assembly

Figure 7   Complete Swivel (HHR-1)

Figure 8   Swivel fastening (Fixed Mounting kit, MKE-1BK)
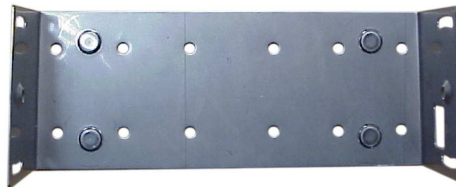
Figure 9   Fastened Swivel

Figure 10   Fastened Swivel

7.2 TMR880i installation by using an installation plate (9500318)

7.2.1 Installation plate

Mount the four pads included in the Installation Kit (0262851) onto the bottom of the Installation plate (9500318).

There are 12 holes in the bottom of the Installation plate for fixing the bracket onto a base, panel etc.
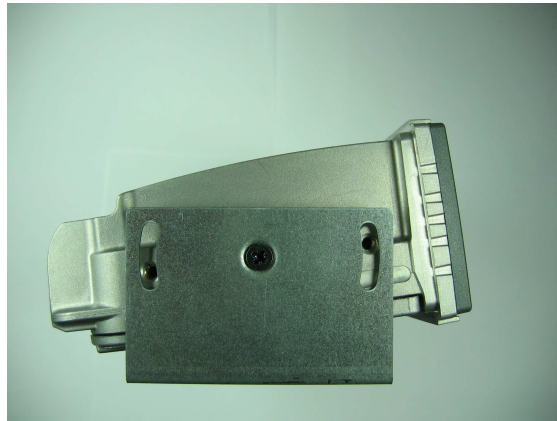
Fix the TMR880i radio unit to the Installation plate with two of the stainless steel screws provided in the screw bag. The maximum inclination for the radio unit is approx. 10 degrees.

Installation Kit (0262851) includes three tape strips, which are needed to prevent the vibration of the Installation Cover's cooling fins. The above picture shows the attached tapes.
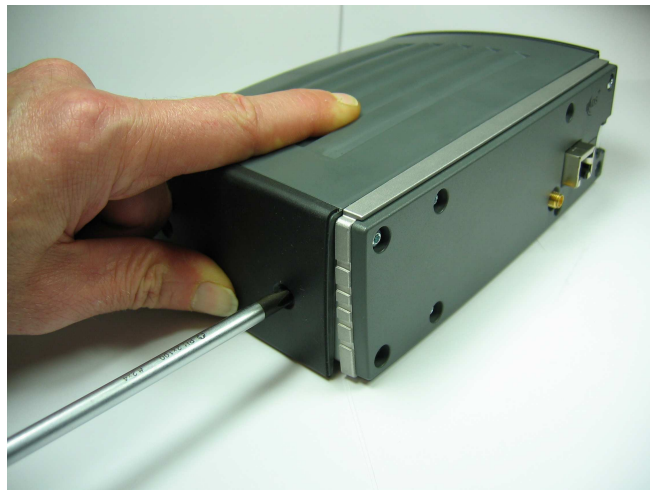
When installing the installation cover on the TMR880i radio unit, press the spot shown above to ensure the cover is positioned at the proper height with respect to the Front Panel. The screw bag contains four black mounting screws to secure the cover in place.

7.3 CUR-3 installation into DIN-slot by using the DIN-slot installation set

7.3.1 Preparations for DIN-slot installation bracket

Assembly DIN-slot installation bracket (9537050)

Notice before installation!

Electrical or manual unlocking system must be in use before inserting the DIN-slot installation adapter into the DIN-slot installation bracket.

Please read these installation guidelines carefully through and follow them faithfully. EADS cannot guarantee the targeted functionality if EADS´s installation instructions are not properly followed.
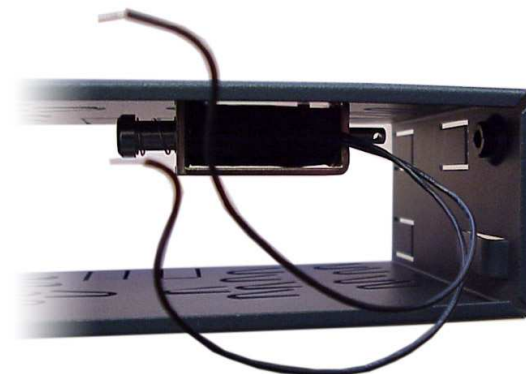
Electrical unlocking

The assembly DIN-slot installation bracket (9537050) includes electrical unlocking by means of a solenoid. To be able to release the radio from the DIN-slot, connect 12 V DC directly to solenoid wires. Also an external switch can be used (not included in the Sales Package).
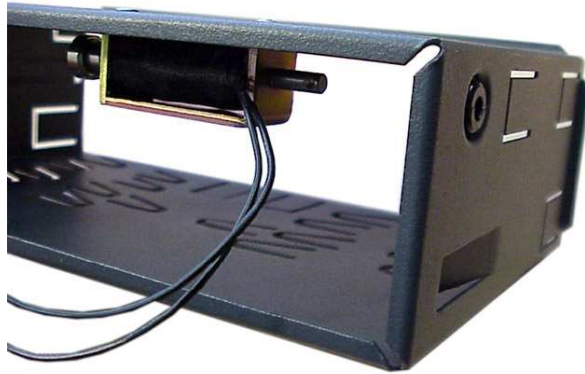
Manual unlocking

The solenoid's shaft has an option for a pull cord for manual release. Slip the pull cord through the hole in the side of the Assembly DIN-slot installation bracket (9537050) and position it as desired. (Pull cord is not included in the Sales Package).

There is also a mounting hole for screw fastening (M4) at the back panel of the TMR880i radio unit.

The fixing tabs of the assembly DIN-slot installation bracket can be bent.

7.3.2 Preparations for DIN-slot installation adapter

Fasten the swivel (HHR-1) into the DIN-slot installation adapter with screws.

DIN-slot installation adapter is mounted inside the DIN-slot installation bracket and will be locked with solenoid.

7.3.3   Attaching CUR-3 into DIN-slot installation set

Attach the swivel (HHR-4) into the CUR-3 and fasten CUR-3 into the swivel as described in Chapter 7.1.3 .

7.4 Instructions for shortening the installation cable (CA-103, CA-104, CA-108)

It is possible to shorten the installation cables CA-103 and CA-104 and CA-108 by using an extra connector. Those modifications have to be made by professional to guarantee the functionality and performances of the product with the modified cable.

EMC testing has been performed with 0,75m long cable in the shortest but EADS does not take any responsibility over the shortening operation.

The modification consists of cutting the cable and rewiring the connector on the radio side (① High density 26 AMP plug (X1)) using a new high density 26 AMP plug.
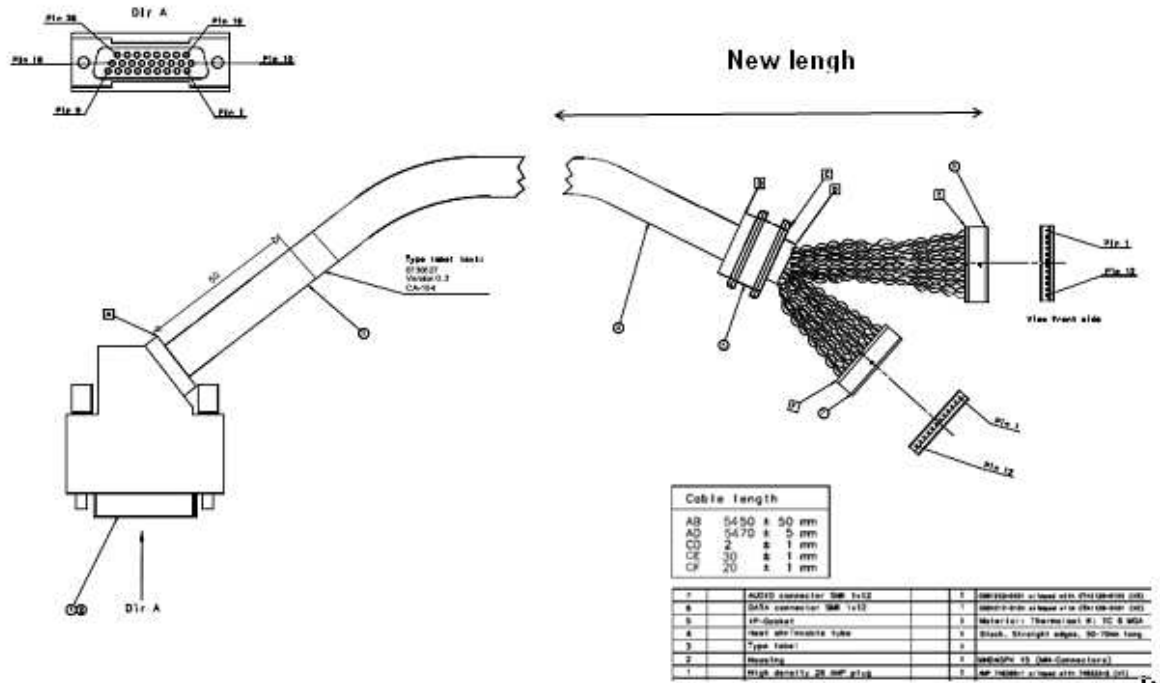

Figure 11   Appearance of Installation Cable

During the modification, attention should be given to the connection from ground wire to the shield of the connector.

Figure 12   Appearance of Installation Cable X1

The X1 connector cover which has to be assembled according to Dir. A in Figure 12.

The connection on X1 is described in the following circuit diagram and table.
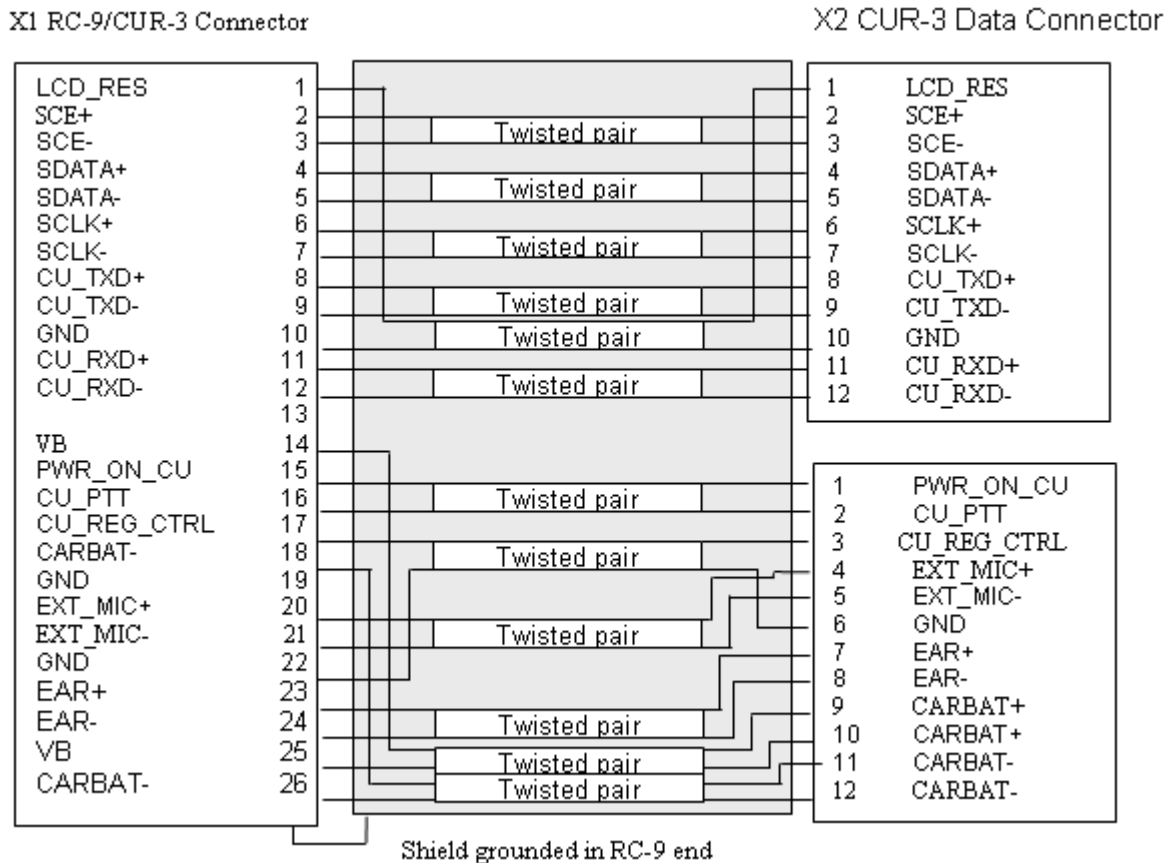
Connections, pin numbers, cable colours are listed in the following table.

Pin	Signal	IN/OUT	Cable Color (1)	Cable thickness	Twisted with line (pin)	Unit	Notes
1	/LCD_RES	OUT	Green/Black	AWG26	GND (10)	V	Logic low/high
2	/SCE+	OUT	White/Red	AWG26	SCE- (3)	V	Driver common mode output voltage
3	/SCE-	OUT	White/Black	AWG26	SCE+ (2)	V	Driver common mode output voltage
4	SDATA+	OUT	Brown/Red	AWG26	SDATA- (5)	V	Driver common mode output voltage
5	SDATA-	OUT	Brown/black	AWG26	SDATA- (4)	V	Driver common mode output voltage
6	SCLK+	OUT	Grey/red	AWG26	SCLK- (7)	V	Driver common mode output voltage
7	SCLK-	OUT	Grey/Black	AWG26	SCLK+ (6)	V	Driver common mode output voltage

Pin	Signal	IN/OUT	Cable Color (1)	Cable thickness	Twisted with line (pin)	Unit	Notes
8	CU_TXD+	OUT	Purple/Red	AWG26	CU_TXD- (9)	V	Driver common mode output voltage
9	CU_TXD-	OUT	Purple/Black	AWG26	CU_TXD+ (8)	V	Driver common mode output voltage
10	GND		Green/Red	AWG26	/LCD_RES (1)		
11	CU_RXD+	IN	Blue/Red	AWG26	CU_RXD- (12)	V	Driver Common mode voltage limits
12	CU_RXD-	IN	Blue/Black	AWG26	CU_RXD+ (11)	V	Driver Common mode voltage limits
13	-	-		-	-	-	-
14	VB	OUT	Purple/Red2	AWG26	VB	V	Supply voltage
15	PWR_ON_CU	IN	Green/Red2	AWG26	CU_PTT (16)	V	Logic low/high
16	CU_PTT	IN	Green/Black2	AWG26	PWR_ON_CU (15)	V	Logic low/high
17	CU_REG_CTRL	OUT	White/Pink2	AWG26	GND (22)	V	Logic low/high
18	CARBAT-	OUT	Blue/Red2	AWG26	CARBAT-		Car battery ground
19	GND						
20	EXT_MIC+	IN	Brown/Black2	AWG26	EXT_MIC- (21)	Vrms	External microphone signal level
21	EXT_MIC-	IN	Brown/Red2	AWG26	EXT_MIC+ (20)	V	External microphone ground
22	GND		White/Black2	AWG26	CU_REG_CTRL (17)		Ground
23	EAR+	OUT	Grey/Red2	AWG26	EAR- (24)	Vpp	Connected to audio PA
24	EAR-	OUT	Grey/Black2	AWG26	EAR+ (23)	Vpp	Connected to audio PA
25	VB	OUT	Purple/Black2	AWG26	VB	V	Supply voltage
26	CARBAT-	OUT	Blue/Black2	AWG26	CARBAT-		Car battery ground

1) The first color is the color of the wire.

The second color is the color of the dot added to the wire. "2" means there are 2 dots added to the wire.

7.5 Power distribution

Before installation, make sure that all the relevant parts of your vehicle (battery, car battery terminal etc.) are in proper condition. Please read these installation guidelines carefully through and follow them faithfully. EADS cannot guarantee the targeted functionality if relevant parts of the vehicle do not work properly or EADS´s installation instructions are not properly followed.

The car kit's main supply is obtained from the vehicle battery. **The supply voltage may vary between 10.8 and 15.6 Volts.** The positive voltage is taken directly from the battery, unless the vehicle has a

mains voltage of other than 12 volts. This minimises the risk of disturbances from or to the radio unit, as well as guaranteeing loss-free power distribution. **Grounding cable is connected to the car chassis, with as short a lead as possible (not directly from the negative pole of the battery!).**

Battery connections should be carried out with care. The positive lead has a 5A fuse, which must always be used. If a fuse blows, replace it only with the same fuse type and size. Note that there is an 5A fuse 125 °C rated available as accessory.

The power cables should be routed so that possible sources of disturbance are avoided.

If the vehicle has +24V electrical system (trucks, all-terrain vehicles, etc), an external voltage converter must be used. That converter must be well protected against transients produced by the vehicle's electrical system, and it must also be capable of maintaining stable output during rapid changes in load current.

Some vehicles have a main switch (e.g. gas trucks), which separates the vehicles chassis from the negative lead of the battery. Under no circumstances do not pass this switch, in other words, the grounding of the reducer must be taken from the body of the vehicle, <u>NOT</u> directly from the battery.

The system cable CA-105 includes supply wires. The red cable is connected directly to the positive (+) pole of the vehicle's battery via a 5A fuse. The positive power cable should be connected directly to the car battery terminal and no other appliances can be connected to this cable. A fuse must be installed in the positive battery lead as close to the battery as possible. The power cables must be cut to a suitable length. The black negative cable is connected to the car chassis, close to the radio unit. The negative cable should be as short as possible.

Grounding:

Grounding should be done separately and not to the car's existing screw connections.

The grounding place must be firm (for example a lap joint of metal plates) so that the screw connection will be reliable in the long term.

The grounding place must be cleaned carefully of paint, and it should be given rust prevention with Vaseline or a suitable chemical.

The grounding cable must be as short as possible to reduce noise coupling, and it must be placed as close to the radio unit as possible.

7.6 System cable
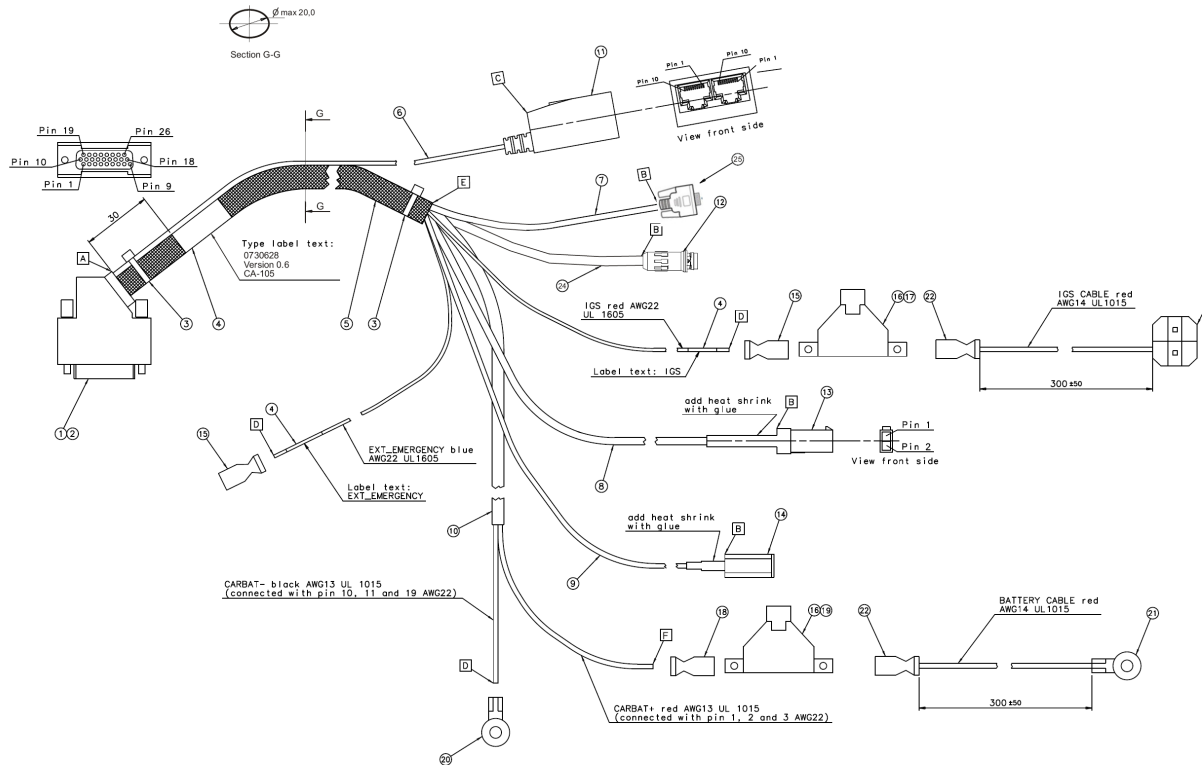
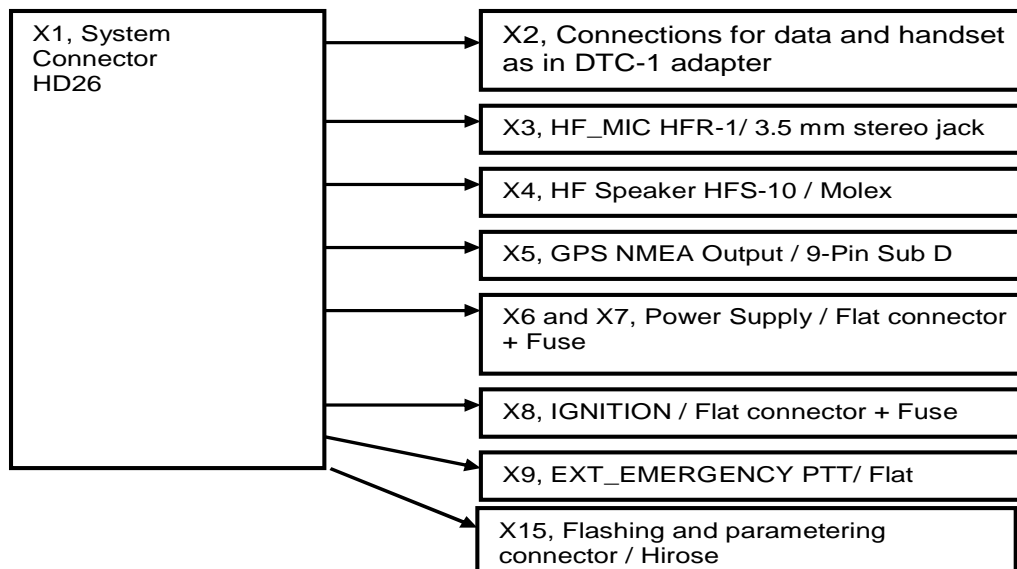| Part No.	Connector	Name		Qty	Note
25	X5	GPS-connector		1	ACON: DBW20-091F200
24		Flashing connector cable		1	Fujikura: KPPV #28X8C (CS)
23	X14	Top splice (current robber)		1	AMP: 0-0735410-0
22		Flat connector		2	AMP: 140971-2
21	X13	Cable shoe connected to battery		1	JST: R8-6
20	X6	Cable shoe		1	AMP: 342145-1
19	X11	Fuse 5A		1	LITTELFUSE: 257005
18	X7	Flat connector		1	AMP: 0-0034071-0
17		Fuse 1A		1	LITTELFUSE: 257001
16		Fuse holder		2	NELTRON : JEF708D
15	X8, X9	Flat connector		2	AMP: 0-0034070-0
14	X3	HF MIC connector 2.5mm stereo jack		1	FUAN GEE: Ja32101
13	X4	HF SPEAKER connector		1	MOLEX: 39-01-3026(5559-02P1-BL) + MOLEX: 39-00-0061(5558-PBT)
12	X15	Flashing connector		1	HIROSE: HR30-7J-12PC(71)
11	X2	Integrated DTC-1 connector		1	CEANTS: 492V144A (SCR-14)
10		Battery cable		1	Fujikura : KV #14(41/0.26 TA) RD (CS) + Fujikura: KV #14(41/0.26 TA) BK (CS.)
9		HF MIC connector cable		1	Fujikura: KVV-SW #24X2C (CS.) (DIA.4.0)
8		HF SPEAKER connector cable		1	Fujikura: KV #22(17/0.16 TA) BK (CS.) + Fujikura: KV #22(17/0.16 TA) RD (CS.)
7		GPS connector cable		1	Fujikura: KPPO #28 X9C (HF,CS) + ACON: DBW20-091F200
6		DTC-1 connector cable		1	Fujikura: KVV #28-SWX2C+#28X7C (CS.) (DIA4.8)
5		Nylon cable braid (black)		1	KITAKAWA: EXP-13-FR
4		Type label		3	TYTON : TAG 9-100, HASHIMOTO: 133-380012-A
3		Cable tie		2	PANDUIT : PLT1M-M30
2		Housing		1	MH Connector: MHD45PPK-15-K
1	X1	High density 26 AMP plug		1	AMP : 0-1658682-1

System cable connections:

X1, System Connector HD26

X2, Connections for data and handset as in DTC-1 adapter

X3, HF_MIC HFR-1/ 3.5 mm stereo jack

X4, HF Speaker HFS-10 / Molex

X5, GPS NMEA Output / 9-Pin Sub D

X6 and X7, Power Supply / Flat connector + Fuse

X8, IGNITION / Flat connector + Fuse

X9, EXT_EMERGENCY PTT/ Flat

X15, Flashing and parametering connector / Hirose

| Connector(s)	Name	Note
X1	High Density 26 AMP plug	AMP 1658682-1
X100 (X2)	10-pin modular connector in X2 (DTC-1)	SS-641010-NF-K1 (Stewart)
X200 (X2)	10-pin modular connector in X2 (DTC-1)	SS-641010-NF-K2 (Stewart)
X3	3.5 mm stereo jack (HF_MIC connector)	Extension jack socket ∅ 3.5 mm, 3 pole, colour black / FUAN GEE Ja32101
X4	Molex 5559 (HF Speaker connector)	No. 39-01-3026 crimped with 5558
X5	9-POS D SUB connector (NMEA Output)	Female
X6	Cable shoe	AMP 735410-0
X7	Butt splice	AMP 34071 (Blue)
X8	Butt splice	AMP 34070 (Red)
X9	Flat connector	AMP 34070
X10	Blade- 'Plasti Grip'(for connection with power supply unit)	AMP 140971-2
X11	Fuse 5A Fuse Holder with protective cap	257005/Littelfuse Bussmann HHF with cover HHD-C
X12	Fuse 1A Fuse Holder with protective cap	257001/Littelfuse Bussmann HDD with cover HHD-C
X13	Cable shoe connected to battery	JST: 342145-1
X14	Tap splice (current robber)	AMP 735410-0
X15	Hirose Plug	HR30-7J-12PC

System cable length:

From system connector X1 to	Cable length
X2	1500 ± 50 mm
X3	500 ± 50 mm
X4	500 ± 50 mm
X5	500 ± 50 mm
X6-X9	2000 ± 50 mm
X15	500 ± 50 mm
Battery connection cable	300 ± 50 mm
IGS connection cable	300 ± 50 mm

System cable diameter:

	Cable diameter
G-G	20 mm max

7.7 Flashing and parametering

In EADS TMR880i, programming cable needs to be inserted into connector in system cable. Please see the figure below.
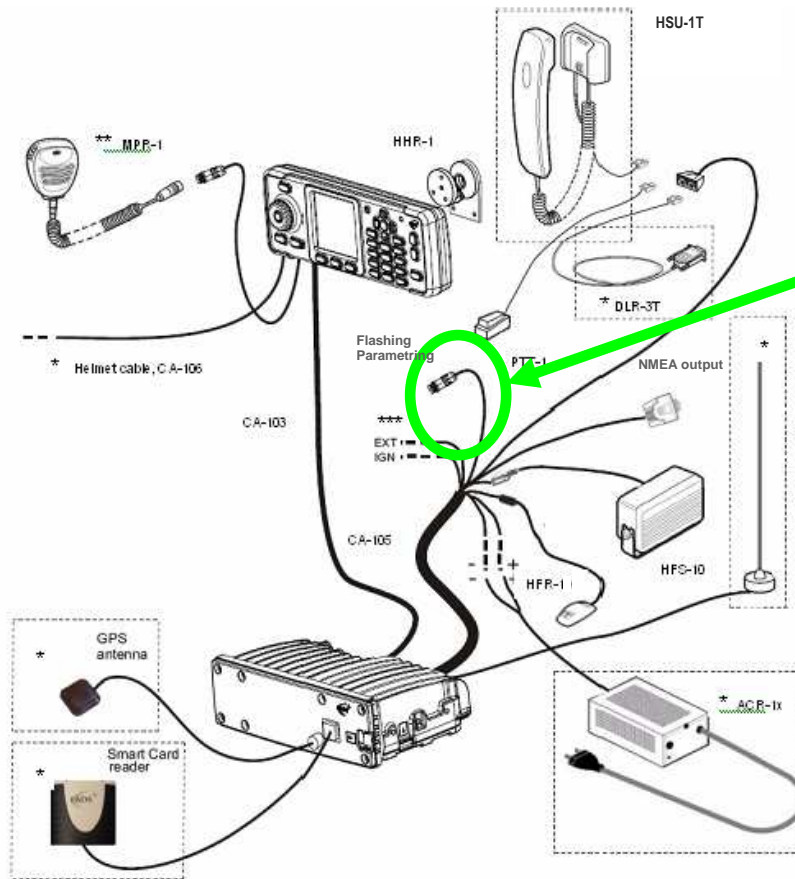
For EADS TMR880i programming, connect programming cable into this connector

Important issue which shall be taken into account when connecting system cable (CA-105) to TMR880i terminal during flashing:

If system cable is connected incorrectly, it can cause a voltage peak. Due to that voltage peak, some component of TMR880i terminal can get broken. As a result of this broken component is, that E2EE smart card reader does not work properly.

Note the rules on the following page :

System cable should be connected to TMR880i terminal by complying following rules:

Option 1:

Main power (DC 13.2 V/5A) must be switched off, if flash cable is connected to system cable, when system cable is connected or disconnected to/from terminal.

Option 2:

Main power (DC 13.2 V/5A) may be switched on, if flash cable is disconnected from system cable, when system cable is connected or disconnected to/from terminal.

7.8 Use without CUR-3

RC-9 can be used without external control unit CUR-3, for example as a modem.
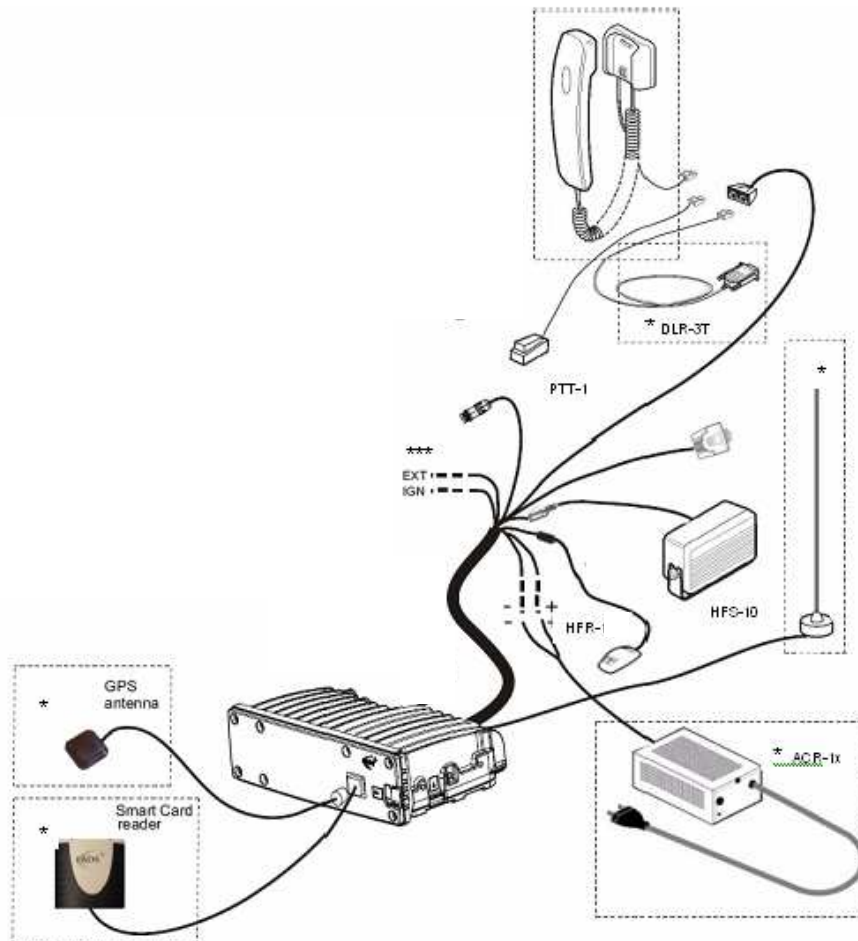
In that case the radio unit can be powered on/off by IGS line (see pin 20 of system cable, §4.0).

If there are electricity breaks when IGS line is activate, the radio unit will start again automatically.

7.9   Audio accessories use

Different audio accessories can be connected to TMR880i.

- Speaker microphone (MPR-1)
- Handset (HSU-1T)
- Handsfree (PTT-1, HFS-10, HFR-1)
- Additional audio through auxillary interface

Recognition

- Speaker microphone and handsfree accessories are automaticaly detected.
- Handset and auxillary accessory connector need HS_HOOK signal to activate the audio path.

Simultaneous use

- Speaker microphone and handsfree can be used simultaneously.
- When user takes off the handset, MPR-1 and handsfree are muted.