CHAPTER 1

GENERAL DESCRIPTION AND TECHNICAL SPECIFICATION

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1.1 INTRODUCTION

1.1.1 General

The primary function of the Video Control Unit (VCU) is to interface BridgeMaster E transceivers to third party displays, and to provide various operator controllable video processing functions to the video supplied to third party displays.

It also has the capability to interface BridgeMaster I & II transceivers to third party displays with the same functionality described above.

It also has limited capability to process video from third party radar systems to third party displays with the same functionality described above.

The Video Control Unit consists of two main parts, a processing unit and control panel.

The control panel may be mounted either as an integral part of the processing unit, or may be mounted remotely.

Communication between the processing unit and the control panel is via a two way serial data link. Control and switch settings are sent from the control panel to the processing unit; the processing unit replies with tellback information.

1.1.2 Processing Unit

The processing unit may be either bulkhead mounted or desktop mounted.

The unit is comprised of a power supply unit (65841803) with filtered mains input and a VCU logic PCB (65857801).

With the exception of the mains input supply and the coaxial connections, all interconnections are made to the VCU logic PCB.

All cables are routed through cable clamps that terminate the braids to ground to minimise EMC effects.

Coaxial connections are made to externally accessible BNC connectors.

The video input to the processing unit may be of positive or negative polarity. Provision is made to adjust the sensitivity of the video input.

The video output may be selected to be of either positive or negative polarity. Provision is made to adjust the amplitude of the video output.

The trigger input characteristics may be either coaxial, or RS422 format.
The trigger output is of fixed amplitude and is characterised to drive a coaxial cable.

The processing unit communicates with the control panel via a two-way serial data link, in addition the processing unit supplies the +9V power required by the control panel.

Transceiver pulse length inputs if available are used by the processing unit to optimise the internal settings for the video processing.

A standby dc power supply may be connected to the VCU logic PCB to maintain the basic buffering and interfacing functions if the Video Control Unit's power supply fails.

The switched mode power supply unit operates from either 115V AC 50/ 60 Hz or 230V AC. The operating voltage is selected by internal links.

The power supply unit automatically switches on when mains is applied to it.

Power Supply Unit 65841803
This is a universal power supply with a number of different voltage outputs, of which only the +5V, and ±15V outputs are used in this application.

Mains to the power supply unit is routed through a fuse (FS1) and a mains filter.
A yellow indicator on power supply unit PCB indicates presence of the mains supply.

Although the power supply unit can be remotely started, in this application it starts automatically when the mains supply is applied. This option is selected by a link setting.

Links on the power supply unit PCB select between 230V and 115V operation.

A transient suppressor on the mains input protects the power supply against overvoltage transients; in severe cases such transients may cause the fuse FS1 to blow.

Overload protection will cause the power supply to shut down if an overload is detected. To reset the power supply it is necessary to remove the mains supply, this can be achieved by removing FS1.

Apart from the link settings there are no presets to be adjusted when the power supply unit is changed.

Video Control Unit Logic PCB 65857801
This PCB is supplied with +5V, and ±15V from the power supply unit. A 9V regulator supplied from the +15V supply provides the power for the control panel.

In addition to the video processing the board performs the following functions:
It accepts positive or negative video inputs, and can output either positive or negative video.

It buffers the trigger, and in the case of RS422 trigger input the trigger is converted into a format suitable for driving a coaxial line.

An external standby power supply may be connected to the PCB to maintain the above functions in the event of loss of the mains supply to the unit, or failure of the power supply unit. Under these conditions the control panel will not function and all video processing is inhibited, but basic trigger and video will be present at the outputs.

If it is not required to convert the trigger from RS422 to coaxial format, and the video input and output amplitudes and polarities are the same, an option is provided for relays to route the signals straight through the unit in the event of power failure. In this case the external standby power supply is not required.
Presets are included to allow the video input level to be normalised and the output level to be set. These presets need to be reset if the PCB is changed.

In addition there are a number of customising DIL switches and links that need to be set.

Useful test points

On PCB 65857801 (all measured wrt TP4)

TP1	+5V	+4.6V - +5.25V
TP2	+15V	+14V - +16V
TP3	-15V	-14V - -16V
TP5	+9V	+8.5V - +9.5V
TP16	+5V standby supply	+4.6V - +5.25V
TP21	Input video level	Positive video peak amplitude 3V set by RV4
TSD1	+standby supply	+12V - +16V
TSD5	-standby supply	-12V - -16V

Indicators

The four indicators below indicate the mode selected at the control panel, they are useful when the control panel is mounted remotely from the processing unit.

D27	RAW
D28	MANUAL
D29	AUTO
D30	INTFER REJECT

1.1.3 The Control Panel

The control panel may be integral with the processing unit or it can be console or bulkhead mounted.

Control settings are communicated to the processing unit via a serial data link.

When the control panel is remotely mounted a blanking plate is supplied for fitting to the cover of the processing unit.

The control panel is illuminated and includes the following variable controls:
Panel Dimmer
Gain
Anti-Clutter Sea
Anti-Clutter Rain

The following switches with associated tell back indicators select the mode of operation.

Raw

In this mode buffered but unprocessed video is fed to the display; the anti-clutter controls have no effect.

Manual

In this mode level of gain, anti-clutter sea, and anti-clutter rain control applied to the video may be set manually by the operator using the controls on the control panel.

Auto
This mode provides adaptive video, ie the anti-clutter rain, and anti-clutter control levels are set automatically by the characteristics of the incoming video. In this mode the anti-clutter rain, and anti-clutter sea controls are inoperative.

Interference Reject
This mode may be selected for use in association with either Auto or Manual modes. It introduces correlation between video from consecutive transmission pulses to reduce the effect of noise and interference

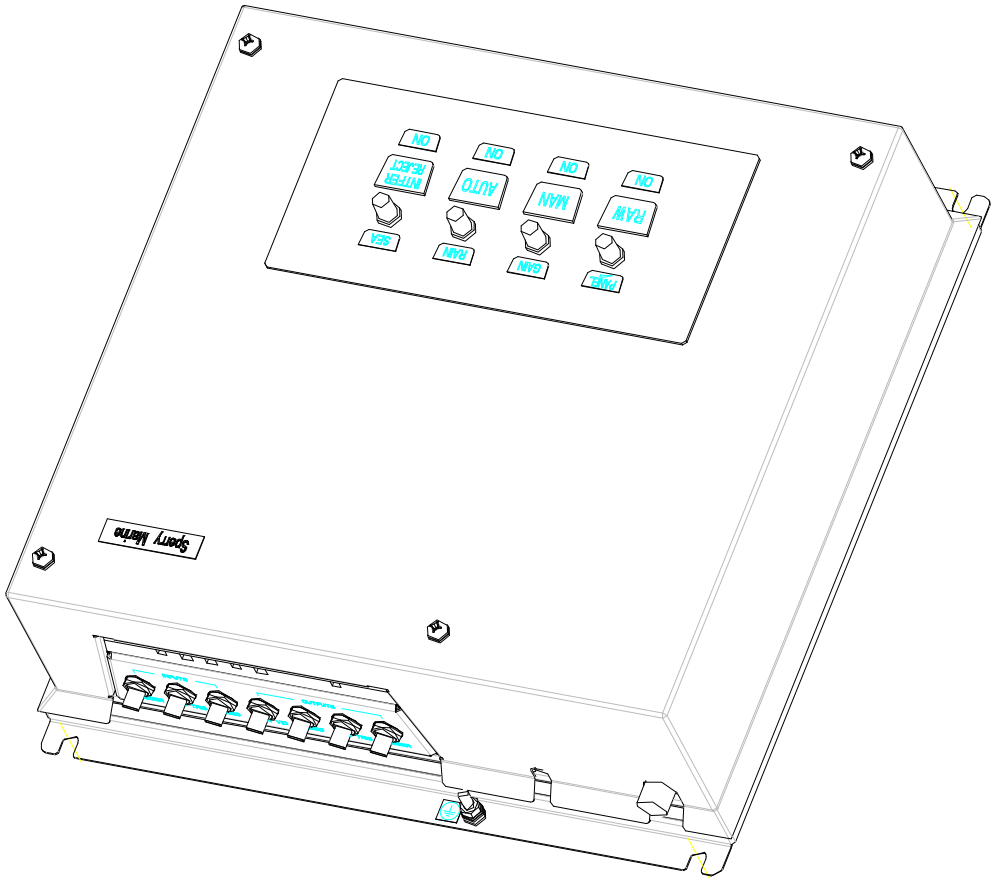

Figure 1.1 Video Control Unit General View

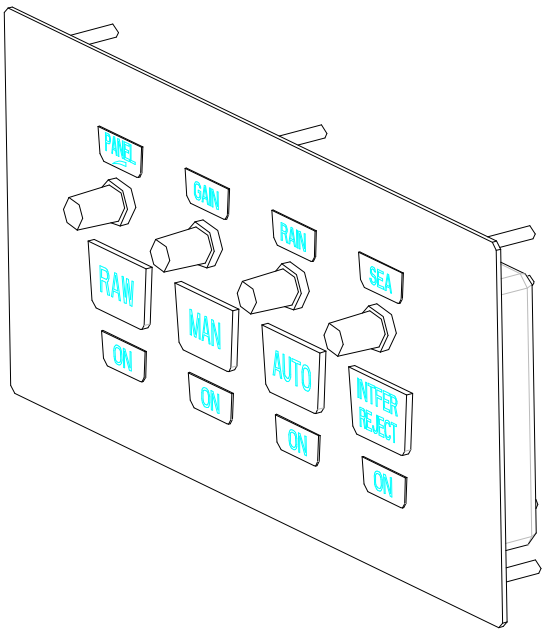

Figure 1.2 Control Panel General View

1.2 SYSTEM CONFIGURATION

Figure 1.3 shows two typical system configurations.
Figure 1.3a shows the Video Control Unit (VCU) operating with a BridgeMaster E Transceiver or scanner unit.
Figure 1.3b shows the VCU operating with a third party display and a third party radar system.

In the second configuration a Radar Slave Interface Unit (RSIU) is introduced to convert the signals from the third party radar system into a format compatible with BridgeMaster E.

The requirement to fit the RSIU is dependant on the characteristics of the third party radar system, if the signals are compatible with BridgeMaster E then the RSIU will not be required.

The standby power supply shown is an optional requirement that ensures that the output signals from the VCU are maintained if mains power to the unit is lost, or the power supply unit fails.

When operating with a BridgeMaster E Transceiver, the power can be taken from the transceiver, similarly the power could be taken from the third party radar system if it is available.

The control panel can be mounted integrally with the processing unit, or may be separated from it by up to 65 metres

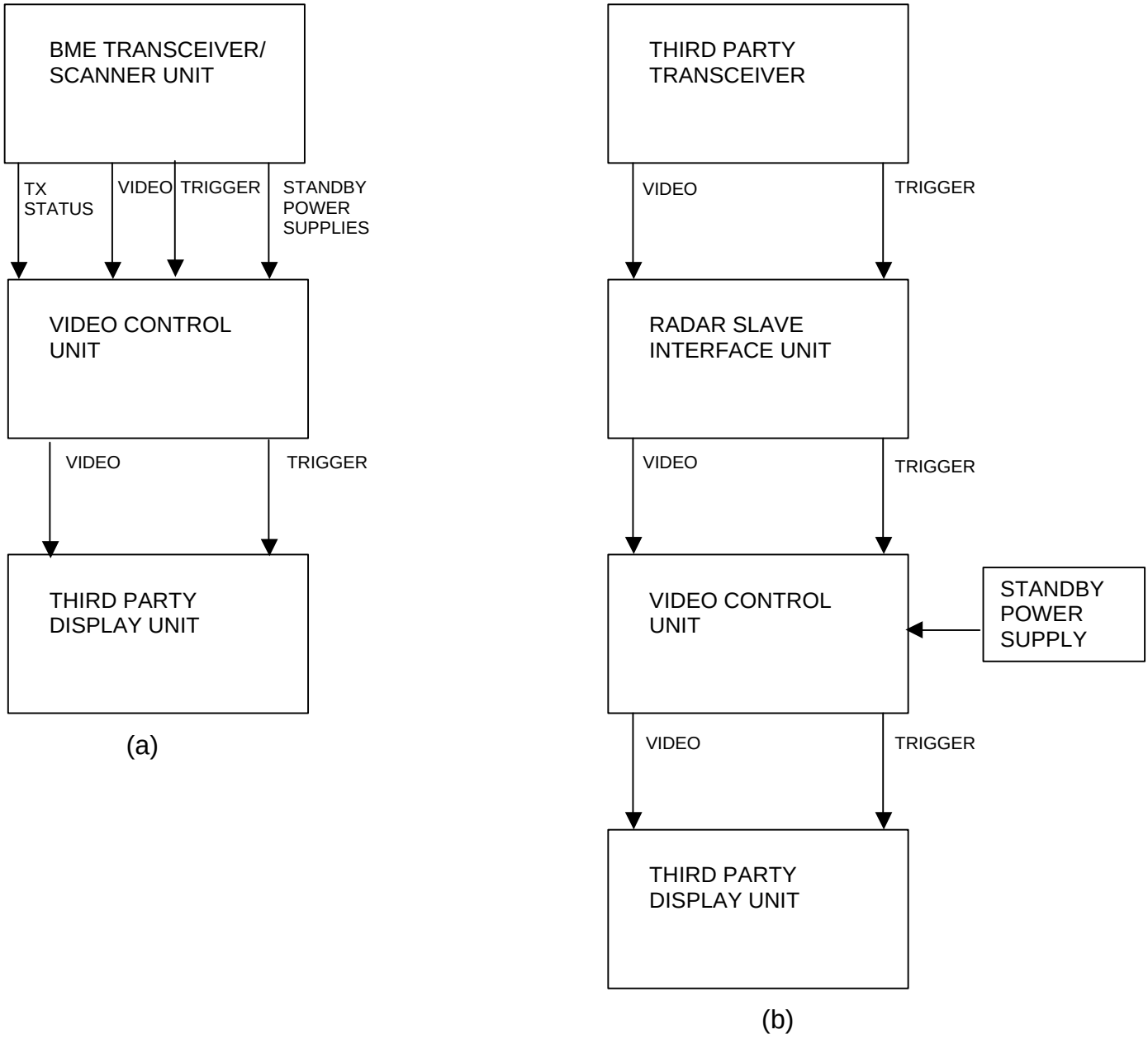

Figure 1.3 Placement of Video Control Unit in the System

1.3 TECHNICAL SPECIFICATION

1.3.1 Principle Parameters

Video Input

Input Impedance	75? or 50? selectable by links
Amplitude	3.5V ± 1V
Noise Level	0.5V (approximately)
Polarity	Positive or negative

Trigger Input (coaxial)

Input Impedance7	75? or 50? selectable by links
Amplitude	5V to 18V
Rise Time 10%-90%	<100ns
Pulse Length	100ns to 10us
PRF	4KHz max
Timing Reference	defined by leading edge.
Polarity	Positive from 0V

Or alternatively, by link selection:

Trigger Input RS422	
Characteristics	RS422 voltage levels
Input Impedance	120? selectable by links
Amplitude	2V to 5V differential
Rise Time 10%-90%	<100ns
Pulse Length	100ns to 10us
PRF	4KHz max
Timing Reference	defined by leading edge.

MIS Trigger Input (coaxial)

Format	Pulse
Polarity	Positive
Amplitude	5V to18V
Input impedance	75? or 50? selectable by links

Video Output

Amplitude	Adjustable between 1V and 5V when driving 75?
Polarity	Positive or negative from 0V
Output Drive	To drive 75? or 50? correctly terminated coaxial cable
Rise Time 10% - 90%	35ns max
Fall Time 10% - 90%	35ns max

Trigger Output

Amplitude	8V min – 15Vmax Could drop to 7.5V in fail safe mode if standby supply is 12V.
Rise Time 10%-90%	<10ns
Pulse Length	Dependant on duration of I/P trigger, limited to approx. 2us max.
Polarity	Positive from 0V
Output Drive	To drive 75? or 50? correctly terminated coaxial cable

1.3.2 Power Supplies

Ship's Mains Supply
Inputs:

Single Phase a.c. input	95V min	276V max
Frequency	47Hz min	64Hz max

Over-voltage Transients — 40% above nominal for 1 sec max without causing damage. It is permissible to blow a fuse or mcb.

Pulsed transients — + 1200V peak, rise time 2 to 10us, duration <20us. Common or differential mode.

Under-Voltage — Mains dropout will be monitored and may cause the system to reset.

Standby Power Supplies

+15V	+11.5V min	+16.5V max
Current	250 mA	
-15V	-11.5V min	-16.5V max
Current	250 mA	

1.3.3 Environmental

Temperature

Operating Temperature	-15°C min	+55°C max
Storage Temperature	-25°C min	+70°C max

Relative Humidity
93% at 40°C non-condensing

1.3.4 Weights and Dimensions

Complete unit including control panel

Height mm.	Depth mm	Width mm	Nominal Weight Kgms
436	142	420	11

control panel

Height mm.	Depth mm	Width mm	Nominal Weight Kgms
255	48	121	0.6

Compass Safe Distance

Standard	Steering
0.9 m.	**0.6 m.**

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