

HYPER-FIX

Receiver Controller

Type 90515



FUNCTION

The Hyper-Fix Receiver/Controller has the dual function of shipborne (or monitor) receiver and shore station control unit. Selection of the required configuration is made from the keyboard when the unit is first switched on and initialised. At this stage, the unit is designated as CONTROLLER or RECEIVER and remains in this mode until re-initialised.

DESCRIPTION

RECEIVER

The Hyper-Fix receiver tracks simultaneously up to 36 signals received from the transmitting chain; these are the f_1 and f_2 signals radiated on a time-shared basis from the transmitters.

It then measures continuously the phase difference between signals received from all possible station pairs in both orientations thereby establishing a maximum of 180 lines of position within the chain pattern.

Any three patterns may be displayed and the intersection of these lines of position yields a fix.

CONTROLLER

The Hyper-Fix controller is used to provide the timing and phase control for the Hyper-Fix chain.

One controller – designated TRIGGER – generates the timing while the other controllers synchronise to it and generate phase locked signals at f_1 and f_2 on a time shared basis. The phase reference for each station can be controlled through the keypad to provide the optimum performance of the chain.

OPERATION

Operation of the Receiver/Controller is almost entirely automatic and requires the minimum of operator involvement after initial setting-up. All basic parameters are stored in a battery-powered memory.

Synchronisation is completely automatic, achieved by a dedicated microprocessor using digital filtering and correlation techniques to match integrated samples of the received signal, with a stored replica of the trigger waveform. The receiver can operate for approximately 20 minutes after loss of trigger signal.

Instrumental resolution of the unit is .001 lane, giving a typical standard deviation of 0.005 lane, which is rounded and displayed to a resolution of 0.01 lane. This equates to less than 1 metre on the baseline when using typical chain frequencies in the range 1600 kHz-3400 kHz. Operationally, this provides a highly stable transmitted signal and a very stable pattern display.

This performance is achieved by the use of highly stable frequency synthesisers, advanced sampling techniques and the use of digital second order tracking loops with adjustable time constants.

The unit is fitted in a small rugged waterproof case designed to be free standing or stack mounted with other similarly packaged equipment. It has a modular AC or DC power unit requiring supply inputs of 115/230 V 50-400 Hz, or 16-36 V DC respectively. Power consumption is approximately 25 W.



Technical Data Summary

Dimensions and Weight

Height	152 mm (6.0 in)
Width	373 mm (14.7 in)
Depth	280 mm (11.0 in)
Weight	9.6 kg (21.0 lbs)

Power Supply Input

Voltage:	115/230 V nominal, 50-400 Hz. 16-36 V d.c. (isolated supply).
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Consumption:	25 Watts approx.
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Environmental

Operating Temperature:	-10°C to +50°C (+14°F to +122°F)
Storage Temperature:	-30°C to +60°C (-22°F to +140°F)
Construction:	This receiver is designed generally to the requirements of DEF 133. For specific end user application please refer to the Company.

Receiving Channel

Frequency Range: (in three bands)	1600 kHz-3400 kHz. The two spot frequencies normally required are each operator selectable to 1.0 Hz.
Sensitivity:	1 μ V into 50 ohms usable. 0.1 μ V minimum to achieve lock.
Selectivity:	± 150 Hz to 3 dB points. ± 650 Hz to 60 dB points.
Timing Synchronisation:	Automatic — employing a dedicated microprocessor.

Phase Tracking Loops

Type:	Digital second order with an operator selectable time constant. No velocity error is induced.
Sampling Period:	20 ms for each sample.
Number of Samples:	50

Phase Difference Patterns

Number processed and lane counted:	180 maximum.
Number displayed:	3 (whole lane numbers may be incremented or decremented by the operator).
Ambiguity Resolution:	Linked to spot frequencies in use.
Facilities:	Automatic error detection and display for three patterns. Selectable automatic resetting of whole lanes.

Displays

Three 8-digit Liquid Crystal Displays:	Each normally presents pattern pair together with whole and fractional lane value to a resolution of 0.01 lane. Exceptionally the upper two displays present other functions and the bottom display is used as a command annunciator.
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Liquid Crystal Display Bar Graph:	Functions as a receiver status and lock indicator.
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Data Output

Serial ASCII:	RS232 or RS422 selectable between 110 and 19200 baud.
Options:	IEEE 488 Sin/Cos analogue Other — provided to client specification.

Technical Manual

STM 1202

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